# REPORT RESUMES

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INTEREST AND INTELLECTUAL INDICES RELATED TO SUCCESSFUL AND NON-SUCCESSFUL MALE COLLEGE STUDENTS IN TECHNICAL AND ASSOCIATE DEGREE PROGRAMS. FINAL REPORT.

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THE PURPOSE OF THE PROJECT WAS TO STUDY THE DIFFERENCES AND SIMILARITIES IN INTEREST, ABILITY, AND PREVIOUS ACHIEVEMENT PATTERNS OF 941 MEN STUDENTS WHO ENROLLED IN VARIOUS TECHNICAL AND ASSOCIATE DEGREE 2-YEAR PROGRAMS AND TO DETERMINE WHICH VARIABLES COULD DIFFERENTIATE BETWEEN STUDENTS WHO COMPLETED, CHANGED TO AN ALTERNATE PROGRAM, OR WITHDREW FROM COLLEGE. TERMINAL BUSINESS STUDENTS TYPICALLY EXPRESSED A POSITIVE INTEREST IN OCCUPATIONS WITH A MANAGEMENT FUNCTION, A HIGH ASPIRATION LEVEL, AND TENDED TO REJECT SCIENCE AND TECHNICAL OCCUPATIONS, (2) ENTERING GENERAL EDUCATION-SCIENCE STUDENTS HAD HIGH ABILITY, STRONG ACHIEVEMENT BACKGROUND, POSITIVE INTEREST IN SCIENCE RELATED OCCUPATIONS AND REJECTED BUSINESS MANAGEMENT FUNCTIONS, (3) GENERAL EDUCATION NON-SCIENCE STUDENTS WERE CHARACTERIZED BY THEIR LOW MASCULINE-FEMININITY SCORE AND A POSITIVE INTEREST IN SOCIAL SERVICE AND VERBAL RELATED OCCUPATIONS, (4) COLLEGIATE TECHNICAL STUDENTS EXPRESSED INTEREST IN SCIENCE OCCUPATIONS AND REJECTED SOCIAL SERVICE OCCUPATIONS, (5) TRADE AND INDUSTRIAL STUDENTS HAD LOW ABILITY SCORES AND POOR HIGH SCHOOL ACHIEVEMENT, TENDED TO REJECT OCCUPATIONS REFLECTING SOCIAL SERVICE, VERBAL OR COMPUTATIONAL ASPECTS, AND HAD INTERESTS DIRECTED TOWARD PHYSICAL, OUTDOOR OCCUPATIONS. IN GENERAL ALL THE VARIABLES STUDIED WERE ABLE TO DIFFERENTIATE AT A FAIRLY HIGH LEVEL BETWEEN STUDENTS WHO ENROLLED IN VARIOUS PROGRAMS. ABILITY FACTORS BEST DETERMINED SUCCESS IN PROGRAMS, AND INTEREST RELATED FACTORS BEST DETERMINED CHOICE OF PROGRAM AND CHANGE FROM THAT PROGRAM. (MM)

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# INTEREST AND INTELLECTUAL INDICES RELATED TO SUCCESSFUL AND NON-SUCCESSFUL MALE COLLEGE STUDENTS IN TECHNICAL AND ASSOCIATE DEGREE PROGRAMS

**DECEMBER 31, 1967**

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Final Report

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# Interest and Intellectual Indices Related to Successful and Non-Successful Male College Students in Technical and Associate Degree Programs

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December 31, 1967

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R.G.T.

## SUMMARY

Purpose of the Project. The purpose of this project was to describe and compare the interest, ability and previous achievement patterns of men students who enroll in various technical and associate degree college programs and to compare these characteristics in students who either complete, change to an alternate program, or withdraw from college.

Design. Nine hundred and forty-one students who enrolled at Ferris State College in the fall of 1965 were used as a study cample. These students enrolled in one of five different major curriculum groupings: (1) Terminal Business - two year programs essentially at the associate degree level, (2) General Education-Science - two year pre-baccalaureate science programs, (3) General Education Non-Science - two year pre-baccalaureate non-science programs, (4) Collegiate Technical - two year technical programs at an associate degree level, (5) Trade and Industrial - two year technical programs at a certificate level.

Variables studied included: (1) vocational interests including interest related variables as assessed by the Strong Vocational Interest Blank, (2) scholastic aptitude as assessed by the verbal, quantitative and total scores of the School and College Ability Tests, (3) previous educational achievement as assessed by an index of high school performance.

Analysis. Results were analyzed in two phases; a description and comparison of students initially enrolling in the five major curriculum groupings and a description and comparison of students who completed the program initially entered, changed to an alternate program, or withdrew from college. Factor analysis was employed in both phases of the study to provide the most comprehensive possible general variables and to reduce data. The general factors obtained through factor analysis were then redefined into interest, interest related and ability-achievement factors. Analysis of variance followed by a posteriori test was then used to determine statistical significance of differences between factor means for students enrolling in the various curriculum groupings and either completing their program, changing to an alternate program, or withdrawing from college.

Results. Observations relevant to each major curriculum grouping are as follows:

Terminal Business. Students entering Terminal Business programs typically expressed a positive interest in occupations with a management function requiring some attention to organization, structure and

detail. These students typically had a high aspiration with concomitant prestige and financial needs implied by high aspirational level scores. The Terminal Business students tended to reject science and technical oriented occupations. The tendency seemed to be to reject that type of occupation which involved physical labor or solitary activities. These students seemed unwilling or unable to specify an occupational goal. The entering Terminal Business students can be characterized as having low general ability and poor previous academic achievement.

The student who transferred from Terminal Business to an alternate program had a stronger interest in technical, physically active occupations as well as more typically masculine interests. The student who completed seemed to have more verbal and general ability than those who did not complete.

General Education Science. The entering General Education Science students could be depicted as having high ability and a strong achievement background. They also expressed a strong positive interest in science related occupations and rejected occupations that reflected a desire to direct and supervise others in business areas.

Successful General Education Science students seemed to have higher ability and achievement backgrounds than their unsuccessful counterparts. They also expressed higher occupational aspirations than the unsuccessful General Education Science students. Students who transferred from a General Education Science program expressed a strong interest in technical, computational occupations, and masculine pursuits.

General Education Non-Science. The entering General Education Non-Science students were characterized by their low masculine-femininity score, implying an interest in books, art, music, non-physical activities. These students typically had a positive interest in social service and verbal related occupations. These interests suggest occupations that have extensive contact with people and interpersonal relationship features.

Unsuccessful General Education Non-Science students who withdrew from college could be viewed as having low ability and low achievement background, and as being disinterested in occupations requiring persistence and attention to detail. Students who transferred from General Education Non-Science to other programs indicated a high interest in technical occupations and masculine pursuits. Successful General Education Non-Science students seemed to have a positive interest in verbal-linguistic occupations and seemed willing to specify an occupational goal and also to have high occupational aspirations.

Collegiate Technical. Entering Collegiate Technical students expressed interest in biological and physical science occupations and tended to reject social service oriented occupations. Their ability and achievement backgrounds were reasonably high.

Unsuccessful Collegiate Technical students who withdrew from college had low verbal and general ability and a poor high school background. Successful students who completed a Collegiate Technical program expressed an interest in occupations requiring an attention to detail, persistence, and orderliness.

Trade and Industrial. Entering Trade and Industrial students has low ability scores and poor high school achievement records. They tended to reject occupations reflecting social service, verbal-linguistic or computational aspects. They also tended to express asipirations similar to skilled and semi-skilled occupational areas. They emphasized technical and masculine interests. The interest seemed to be primarily directed toward physical, outdoor occupations and activities.

Students who successfully completed a Trade and Industrial program had higher technical-masculine interests when compared with the non-successful students. Students who transferred from Trade and Industrial to another program indicated more interest in verbal-linguistic, business contact and management fields and had higher occupational aspirations and verbal ability than students who did not transfer to another curriculum.

Conclusions. Major conclusions are:

1. In general all the variables studied (interest, interest related and ability) were able to differentiate at a fairly high level between students who enrolled in various types of associate degree and technical programs.
2. Occupational interest factors (factor analytically derived occupational groupings of the SVIB occupational scales) differentiated between students enrolling in the various curricula at a higher level than did interest related factors (masculinity-femininity, occupational level and specialization level).
3. Ability related factors were able to discriminate at a high level, particularly at the extremes, between students enrolling in the various associate degree and technical programs.
4. The high school achievement factor, while differentiating at a statistically significant level, did not provide a sufficiently broad range to be of much practical significance.
5. Ability and high school achievement factors were able to differentiate between students who completed their programs, changed to an alternate program or withdrew from college. This was particularly true in comparisons of completing

and withdrawing students with completing students scoring higher. Students changing programs in some instances scored higher and in some instances scored lower than those completing or withdrawing.

6. Interest and interest related factors tended best to differentiate students changing programs from students who completed a program or withdrew from college. Thus, ability factors best determined success in programs with interest and interest related factors best determining choice of program and change from that program.

7. In general, a relationship between internal consistency of a curriculum grouping and ability of factors to predict was found. Business and Collegiate Technical curriculum had the most heterogeneous grouping of programs and produced the fewest significant differences. Trade and Industrial programs were the most homogeneous and produced the largest number of significant differences.

8. A relationship between type of program and level at which different types of factors would predict was found. Rating the programs from more academic to less academic it was found that ability factors could predict better in the more academically (associate degree) than in the less academically (certificate) programs.

# CHAPTER I

## INTRODUCTION

Present day demands placed upon higher education to serve an ever increasing heterogeneous group of students has augmented the need to revaluate all aspects of education policy including admission policies, program offerings, and pre-college counseling. Technical and associate degrees are becoming increasingly more significant to a large percentage of college students. In a message to Congress in 1963 the late President Kennedy cited figures which emphasized the current and future need for trained technicians in this country.[1] These figures have served to heighten the awareness of existing opportunities at the technical and associate degree levels of higher education. College enrollments are expected to increase sharply in the future. Consequently, colleges and universities are expanding their curricular offerings to accommodate those students seeking technical training of less than a baccalaureate level.

That a larger proportion of college students are seeking post high school training at the technical and associate degree level has been pointed out by several sources. Collins (1965) indicates that by 1970 over 50 percent of all first year college students will be registered at a public or private junior college. The Coordinating Council of Higher Education (1965) in reporting on the situation of college students in California, indicated that junior colleges served over 70 percent of full time lower division students in that state during the 1964-1965 school year. College counselors and admission personnel have a responsibility to effectively and efficiently guide and direct these students into programs which can provide successful academic experiences and eventual job placement. The question is no longer "Who should go to college?", but rather, "What type of program will best meet the needs of each particular individual?" The problem of bringing the students, institutions, and programs together with mutually satisfying results requires continuing inquiry.

Many educators feel that a more optimal goal choice can be achieved if sound empirically supported concepts of vocational development and choice are constructed. Several theoretical approaches have attempted to bring into focus the process through which late adolescents move in the transition from high school training and education or to a work situation. Super, Ginzberg, and Ausubel have been three of the most active theorists in this area.

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[1] U.S. Department of Labor. Manpower report of the president and a report on manpower requirements, resources, utilization and training. Washington, D.C., March 1963.

Ginzberg (1951) and Super (1963) view vocational choice as a developmental process of several stages. Ginzberg conceptualizes individuals (ages 14-21) as being in a realistic stage of vocational development which has been preceded by previous stages of fantasy or tentative choice. The tentative choice stage is in turn comprised of three substages; exploration, crystallization, and specification. Exploration is the stage in which the individual wants to know as much as possible about himself and about the outside world, testing himself and searching for new perspectives and experiences in order to increase his understanding of reality. Through exploration the adolescent is able to crystallize and eventually specify an educational or vocational choice to which he can commit himself with some confidence.

The most recent formulation presented by Super is in a 1963 monograph. He attempts to deal with exploratory and establishment stages in a way which furnishes a basis for research.

The educational development of the exploratory stage is described as crystallizing an education preference, specifying an education preference, and implementing an educational choice. This is the stage in which the individual narrows his field of preferences, (crystallization or partial specification) then commits himself to a specialized program of education or training, (more complete specification) and finally makes his choice a reality (implementation). A student continuing in a program until successful completion could be seen as crystallizing and specifying his educational-vocational self concept.

Super (1963) continues by defining exploration as referring to "activities, mental or physical; undertaken with the avowed or unconscious purpose or hope of eliciting information about oneself or one's environment, or of verifying or aiming at a basis for a decision, conclusion, solution, or hypothesis, or of being entertained, challenged, or stimulated."

Super describes what he considers to be the important differences between his own and Ginzberg's theoretical position: First, Super's developmental tasks and behaviors which are thought to be associated with the exploratory stage are specified in considerably greater detail; second, his discussion of these tasks and behaviors is specific rather than descriptive or speculative; and third, his exploratory stage is extended to include a testing through trial jobs.

Ausubel (1954) earlier stated: "The adolescent must exchange derived status for primary status, become a person in his own right, and acquire intrinsic feelings of adequacy and worth. In this process the choice of a vocational (or educational) goal plays a crucial role. The chief agent in promoting development is exploration which furnishes the adolescent with opportunities to make (educational) choices and independent decisions, to play different kinds of adult roles, and to establish his own Identity."

In line with this theoretical thinking, a major assumption of this study is that a student enters an educational program to explore whether the requirements and characteristics of the program are congruent with the student's abilities, interests, and educational expectations. One might postulate that students enter certain programs to test the validity of a more or less clearly defined choice. If such a choice of program does not meet with the expectations of self, or there is a lack of congruence between program requirements and capabilities, then the student is likely to choose some other alternative such as changing programs or withdrawing from school.

While this study is not an attempt to explore or verify the vocational theories just discussed, it is felt that understanding or accepting these assumptions might better explain the behavior of college students who remain in an original program or decide to change or withdraw from school.

## Related Research

Intellective indices of success in college. Numerous studies have concentrated on the relationship between high school achievement, aptitude measures, and college success. Fishman and Pasanella (1960) reviewed 263 studies which used the high school record as a predictor of college success. This measure correlated roughly .50 with comprehensive freshmen-year intellective criteria. In 31 additional studies a correlation of .48 was found with comprehensive intellective criteria beyond the first year of college. Several more recent studies have supported this conclusion.

Seibel (1963) in a study of a nationally representative sample of approximately 10,000 high school graduates, found that an aptitude test correlated .50 while high school rank in class correlated at .40 with entrance to college. Hood and Berdie (1964) in a broad study of 24,000 twelfth graders in 1950 and 44,000 high school seniors in 1961, found correlation-coefficients ranging from .30 and .60 between stated intention to enter college and both scholastic aptitude test scores and high school percentile rank. The conclusions drawn from an analysis of the achievement of high aptitude students in college was consistent with a substantial majority of the literature which revealed that past performance predicts future performance, (Holland and Nichols 1964). Similarly an investigation by McCormick and Asher (1964) of several variables, singly and in combination, concluded that the high school grade point average was the best single predictor (v =.59) and that the SCAT* verbal (v =.31) and quantitative scores (v =.37) were less accurate predictors of college grades. A study done by Klugh and Bierley (1959) comparing the SCAT and high school grade point average correlations with first semester college grades, found correlations ranging from .53 to .59 and concluded that there was no significant difference between the predictive levels of these two indices. Ikenberry (1960) indicated that rank in high school graduating class was the best single predictor of withdrawal or persistence in college.

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*School and College Ability Test

In two separate studies, one by Prediger (1965) and a second by Irvine (1965), the conclusions were that the high school grade point average or rank in class was the best single predictor of college persistence and success.

The general concensus based on past research is that high school rank or grade point average is the best single predictor of college success, and the second best predictor of college success is any of the scholastic aptitude tests commonly used for this purpose.

_Critical factors in withdrawal from college_. Withdrawal rates at the college level are constantly being examined and reported. Some studies examine high school grades in relationship to college success, others examine ability, and still others study intellective factors or non-intellective factors as related to college grades and success.

_Junior college and technical schools_. A review of research related to the ability level of junior college students has led to the conclusion that junior college students score relatively lower than four year college students on tests of academic aptitude. Studies of the general relationship of ability level to attrition have led to a related conclusion that ability level is a critical factor in discontinuance of education.

Clark (1960) reported that ACE* scores for students enrolling in 28 California junior colleges fell at the 34th percentile on the national four year college norms. In a frequently quoted study by Wolfe (1954), 60,539 entering students at 200 centers of higher education were administered the ACE, the mean score for the junior college students in this group was 93.8 while mean score for the four year college students was 104.4. Bondy and Hecker (1963) in a series of studies analyzed SCAT scores and grades earned by students enrolling in associate degree and technical programs at Ferris State College. The median SCAT scores ranged from the 28th through the 33rd percentile on national four year college norms. Little difference in ability level between students enrolling in pre-baccalaureate and technical programs was noted. Substantial differences in grades earned were found. Sixty-three percent of pre-baccalaureate students as compared with thirty-six percent of technical students did not receive satisfactory grades during their freshmen year. Low grades, low ability, and underachievement were found to be critical factors in discontinuance of education.

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*American Council on Education Psychological Exam

Despite their low ability scores, when compared to four year college students, technical students score above the population in general. A study by Perrone (1965) of students enrolling in two year mechanical design and electronics programs showed these students scoring between the 50th and 75th percentile on GATB* general population norms.

Four Year College and Universities. Studies relating ability test scores to attrition or continuation at the four year college level are numerous. Summerskill (1962) extensively reviewed the literature related to attrition in four year colleges and found that: (1) in 16 out of 19 investigations, dropouts had lower average aptitude test scores than did non-dropouts, (2) students with definite vocational choices were more likely to be overachievers in college and more apt to graduate. Change and conflict in motivation frequently produce high attrition rates.

In a study of one specific field (Marks et. al., 1962) the findings indicated that male students remaining in journalism had higher total aptitude scores than men who withdrew. All males in this study scored highest on the SVIB literary and sales areas but there was no significant difference between those who withdrew and those who remained on these scales.

Several studies (Righthand, 1965; Prediger, 1965; Chambers et. al. 1965; Stone, 1965; and Slocum, 1965) have indicated that some form of an aptitude and/or achievement test battery was the most successful way of identifying success or attrition at the college level. Righthand (1965) also added that the survey of study habits and aptitude measures aid in identifying the potential dropout. Prediger (1965) cautioned that the ability and achievement measures seem related to persistence only through the relationship to grades. Stone (1965), while he concurred that ability test scores did predict success or attrition, also found that the English, math, social studies or ACT scores did not seem to have much relevance in this regard. Slocum (1956) found a significant difference between students who withdrew from college and students who remained in relationship to rank in high school graduating class and scores on the American Council on Educational Psychological Examination.

Jex and Merrill (1962) studying withdrawal and graduating rates at the University of Utah observed that the dropout rates for students placing in the bottom quarter of their class on the entrance test was 78 percent as compared to 48 percent of those in the top quartile. Over 50 percent of the top quartile group eventually graduated while only 22 percent of the lower quartile group graduated.

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*General Aptitude Test Battery

Rate of withdrawal from college. Several studies have looked at the withdrawal rate in the first or second year of college. Pemberton (1963) observed that approximately one-third of his sample withdrew within the first two years. Iffert (1958) found a somewhat larger percentage of students withdrawing from colleges in California indicating that 31 percent withdrew by the end of the first year and approximately 47 percent by the end of the second year.

Two studies examined the withdrawal rate during the first semester of college. Brown and Callis (1959) at the University of Missouri found that approximately 15 percent of their sample did not re-enroll for the second semester. Iffert (1958) in a larger study of California College indicated that approximately 12 percent did not re-enroll for the second semester.

Reason for withdrawal from college. Pemberton (1963) suggested the primary reason for leaving college was academic difficulty, but noted that about one-third of the total who left school were in good academic standing at the time of withdrawal.

Brown et. al., (1959) more specifically indicated that approximately 37 percent of the students who dropped were officially dropped for academic reasons, another 30 percent voluntarily withdrew, and 32 percent finished the semester but did not return. A comprehensive study by Slocum (1956) of 1951, 1952, 1953 freshmen rates at the State College of Washington indicated that 51 percent of the dropouts were in academic difficulty at the time of withdrawal. Only 31 percent, however, acknowledged that low grades had either been important or very important in their decision to withdraw.

Four studies examine more specifically the reasons cited by students for withdrawing; (Jex and Merrill, 1962; Ikenberry, 1962; Brown et. al., 1959; and Cowhig, 1963). The principal reasons given were: (1) military service, (2) financial difficulties, (3) lack of interest, and (4) low grades. Low grades as a reason for withdrawal was sometimes alluded by citing lack of academic goals or discouragement by low grades, or difficulty with college work. Other reasons mentioned were transferring, marriage, employment opportunity, homesickness, impersonal nature of college, and change of educational plans.

The general conclusion drawn from the review of these studies is that while academic difficulties is not the only reason for withdrawal from college programs, it appears to be the primary reason. Other problems that students encounter such as financial, personal, or social problems appear to contribute or be a part of the academic difficulties that students who withdraw are confronted with.

Longitudinal studies of the dropout problem. Two recent studies have suggested that educators concern over the fate of the college dropout may be unfounded.

Eckland (1964) studied a group of 1,332 males who entered the University of Illinois as freshmen in 1952. Approximately 50 percent of the students graduated from the University of Illinois or some other school with no interruptions. Approximately 70 percent of those who withdrew came back to college sometime during the succeeding ten years. Fifty-five percent of the withdrawal group ultimately graduated. This brought the total graduation rate to 69 percent. This study further emphasized the ability of the high school rank to predict persistence in college. Nine out of ten students who ranked above the 79th percentile in high school eventually graduated from college. Nearly eight out of ten ranked above the 39th percentile in high school rank obtained degrees.

Pervin (1965) surveyed the Princeton graduating classes of 1940, 1951, and 1960. The general conclusions were that differences in academic ability between dropouts and non-dropouts has decreased through the years. Few dropouts claimed lack of ability as a reason for leaving school. The reasons cited for leaving school were: (1) poor motivation and maturity, (2) general lack of interest, (3) boredom, (4) apathy, (5) dislike for the curriculum, (6) lack of goals, and (7) a lack of certainty as to what major to choose. Fifty percent of the 1940 class dropouts returned to college, whereas 97 percent of the 1960 class dropouts returned to college. In examining the percentage of those who received degrees it was found that 53 percent of the 1940 class dropouts eventually received degrees and 88 percent of the 1960 class dropouts received degrees.

The general conclusion seems to be that an initial withdrawal from college is not necessarily the end of college aspirations, and that many dropouts will be eventually successful in college.

Role of interest in educational-vocational decision making. Theorists concerned with the educational-vocational choice as a process extending over a number of years and therefore in a sense irreversible. Research has emphasized the role played by interest in educational choice, education success, and eventual vocational selection. Numerous studies have demonstrated the effectiveness of the Strong Vocational Interest Blank (SVIB) in differentiating between students manifesting various interests and this instrument's relatively low correlation with grades earned and ability.

Fishman and Pasanella (1960) reviewed and summarized 580 studies published during the years 1949 through 1959 dealing with prediction of success in college. They found in reviewing studies of non-intellective predictors that factors measured by such instruments as the Rorschach, Minnesota Multiphasic Personality Inventory, Taylor Manifest Anxiety Scale when compared with global intellective criteria had correlations ranging from .01 to .62. Study habit tests and inveotires correlated between .26 and .66 with college freshmen grades. Interest inventories such as the Kuder Preference Record and the Strong Vocational Interest Blank yielded lower correlations, .05 and .26, though only seven studies of interest factors were reported.

Strong (1952) in a twenty-four year follow up of Stanford alumni found that students who changed their occupations did not score as high on the appropriate scales of the SVIB as students who continued in their occupations.

French (1959), after reviewing studies by Strong in 1951, McArthur in 1954, and Terman in 1947, suggested that the SVIB seemed to have utility in predicting occupational membership. French (1961) studied senior groups at three eastern colleges asking them if they had to do all over again what field would they choose. His results indicated that differences, although small, were consistent in showing interest as a freshmen to be associated with satisfaction in the corresponding field as a senior.

Korn (1962) concluded that in general the various families on the SVIB were able to differentiate between students entering one program as opposed to another. Korn observed that students choose a major not only in terms of the interests that they thought might be satisfied, but also in terms of the interests that they thought would not be demanded. Another study (Darley and Hagenah, 1955) found different SVIB "interest families" for students entering different colleges within the same university. Students of equivalent ability enrolled in the college of liberal arts and college of engineering had widely different interest patterns. Steward (1958) studied male and female high ability college students from the five major geographical areas. The primary conclusion was that high ability students had highly similar interest patterns. A similar study, (Weissman, 1958) found that large proportions of students in a particular major program exhibited similar and distinctive interest patterns on the SVIB.

A study of the education outcomes of 691 men who entered the College of Engineering of Iowa State University in 1957 indicated interest scores discriminated those who stayed in engineering from those who left the university altogether and those who left engineering but graduated in another field (Lewis e. al., 1965).

Palubinskas and Eyde (1961) examined the relationship between applicant SVIB scores and the action of the Medical School Admissions Committee in the class of 1962 at Tufts University Medical School. Those students who were accepted and attending and those students who were accepted and withdrew tended to score differently than those rejected on the physician, chemist, city school superintendent, lawyer, dentist, engineering, math, and architect scales. The rejected group scored higher on scales concerned with life insurance, sales manager, pharmacist, and mortician scales.

Taylor and Bondy (1964) investigated the interest profiles of two year technical versus four year business administration male graduates. A significant difference was found in seven out of eleven families on the SVIB.

Analyzing and comparing SVIB scores for secondary school and college students interested in biological science research, Ross et. al. (1965) found the most outstanding characteristic of the high school and college men was the preferred interest of both groups fell primarily into SVIB Interest Group I, biological science areas. These students rejected the social science, business detail, business contact and the technical interest groups.

Berdie (1960) attempted to determine whether the SVIB could predict occupational entry when administered at the high school level. A sample of graduates from medical school, law school, business administration, and accounting at the University of Minnesota were identified. These individuals had all taken the Strong during their high school senior year. The three occupational groups were first compared on the basis of their scores on 11 selected SVIB scales and then on the basis of interest pattern. The general conclusions were that the Strong could discriminate between individuals in high school who would later enter medical school, law school, or an accounting program.

Three studies reported findings based upon specific samples that were not consistent with the majority of the research with the SVIB. One study by Marks et. al. (1962) concluded that students remaining in journalism had a higher total aptitude score, but that in regard to interest all the men in journalism had a higher total aptitude score, but that in regard to interest all the men in journalism scored high on the literary, sales areas, business and social service categories, Watley et. al. (1962) concluded that the SVIB did not substantially improve the prediction of success of business administration students.

Stephenson (1961) attempted to determine whether or not characteristic SVIB profiles differentiated between high ability students who remained with their expressed education-vocational objectives from those who changed such expression. The results indicated that the SVIB was unable to differentiate between those students who continued with their original educational-vocational objective and those who did not.

Change of major during college. Some educational fields seem more susceptible to student gains or losses than others. Cole (1964) found that over one-half of the students who were originally physics and mathematic majors changed fields while less that 16 percent of those in English, and 10 percent of those in agricultural-science fields did so. Several studies have indicated that students on the whole tend to leave the natural science fields prior to graduation and enter social science or humanity fields, (Pemberton, 1963; Crook, 1965; Williams, 1955; Thistlethwaite, 1960; Forrest, 1961). Thistlethwaite (1960) in a study of academically talented students further specified that the biological sciences had limited holding power but that the natural sciences were relatively successful in retaining students. Both fields, however, attracted new students less frequently than the arts, humanities, and social sciences. Crook (1965) specifically indicated that the schools of agriculture, home economics and pharmacy remain stable, neither losing or gaining more students.

French (1961) looked at this problem in a somewhat different light. His results indicated natural science students tended to be more satisfied than social science students, although about one-fourth of all the students studied were dissatisfied with their original choice of major field. Grande (1964) reports somewhat different conclusions in a study of the persistence and change of educational objectives among engineering students. He concluded that students who entered science fields were less likely to change fields than non-science majors. Men who left these fields were seen as irresponsible, original, and tolerant of ambiguity.

Iffert (1958) seemed to concur with this viewpoint when he indicated that major trends of change were from theoretical to practical subject fields.

Although there seems to be some disagreement among researchers as to the normal direction of change, it appears that the majority of researchers are in accordance with the conclusions that natural science fields tend to lose more students than they gain. The social science or humanity fields tend to gain more students than they lose during the four year process to graduation.

Only three studies were noted which indicated any specific reasons for change. Crook (1965) suggested that the influence of others, personal desires, and vocational and social interests were the predominant reasons for change. Grande (1964) added to this list by indicating that lack of information about curriculum, and lack of interest in course content were also relevant to change of major. Gamble (1962) concurred with Grande's findings but also noted that the effect of parental pressure, especially in that crucial period before registration in college, was important in determining change of major.

Several studies have examined the rate of change in students at the college level. Percentage figures ranging from 27 to 68 percent have been reported among student groups changing curriculum before graduation. Pierson (1962) found that 30 percent of Michigan State University baccalaureate candidates in 1958 graduated in a major other than the one they chose as a freshmen. More specifically, Pierson found that 18 percent had transferred to Michigan State University from some other institution. Ninety-nine percent changed their major as freshmen at Michigan State University, 45 percent as sophomores, and 26 percent as juniors, and two seniors changed majors. Crook (1965) concurs with Pierson in finding that 32 percent of the 1962 senior class at Auburn University had changed majors. Pemberton (1963) in another study of a senior class reported that 25 percent had changed their field of study completely, and that 40 percent reported some change of educational objectives. Cole (1964), in studying another aspect of this problem, examined the change of curriculum rate at the

University of Rochester and at Harvard University. He found that 27 percent of the students at Harvard changed fields while a much larger percentage, 41 percent, changed at the University of Rochester. The general conclusion was that change of curriculum rates may vary substantially from one institution to another. A further complication emerges from a study by Gamble (1962) at Pennsylvania State University. Concentrating only on the first three semesters of attendance at the University, Gamble noted that 38 percent changed majors once, and 5.6 percent changed twice or more. Over half of those who made a single change made that change between the time they were accepted and the time they actually enrolled at the University. Thistlethwaite (1960) in a three year study of National Merit Scholarship winners, found that 48 percent changed their educational goal while in college. In a subsequent study of the same population, Thistlethwaite (1962) found that 33 percent of the students raised their level of aspiration while 9 percent lowered their aspiration level. The majority, 58 percent did not change aspiration level. Iffert (1958) asked students at 149 different colleges to check those major fields in which they had the greatest interest at the time they entered college and found that the average persistent rate for men was 42 percent. Forrest (1961) found that while 50 percent of his sample indicated a change of vocational choice, only 32 percent actually changed their major field of study. The latter finding seemed to be more consistent with Pierson's and Crook's findings. Stephenson (1961) and Warren (1961) in two separate studies of high ability students found that approximately one-half changed programs during their college career.

It appears from those studies of high ability students that a large proportion of students who have high ability are likely to change majors during the college years. The studies which tended to examine more heterogeneous samples indicated approximately one-third of that group changed their educational program during college careers.

## Overview of Project Report

The remainder of this report is concerned with examining the educational paths chosen by college students, in relationship to their high school grade point average, ability scores, and interest scores. These students initially enrolled in one of five discrepant technical or junior college level programs.

In chapter two the problem being studied is defined, hypotheses are generated, population and sample specified, and finally the statistical analysis used to compare and contrast the groups is discussed. Chapter three deals with the results of the first phase of this study which examines the differences and similarities of the students who select different two year programs.

The progress of the 941 students studied throughout the 1965-1966 and 1966-1967 school years is discussed in chapter four. The incidence of withdrawal, change, and reasons reported by students for such action is examined. Phase two results are discussed in chapter five, comparing and contrasting the students who completed their original program in relationship to students who withdrew or changed. A discussion of the relevant findings of this study are presented in chapter six. The summary, conclusions, and implications for future research are also presented in chapter six.

# CHAPTER II

## DESIGN OF THE STUDY

The study is designed to determine whether students who entered discrepant two year technical and associate degree programs could be differentiated in terms of high school grades, ability, and interest scores. A second pupose is to determine whether students who continued, withdrew, or changed from a specific program could be differentiated on the basis of high school grades, ability, and interest scores. Because of the characteristics of the programs being studied and the characteristics of the interest measures employed, this study involves only men students.

### Hypothesis

The research hypotheses are derived at two levels. First, hypotheses will be generated to test differences between the students enrolling in each of the five discrepant technical and associate degree programs. Secondly, hypotheses will be derived to test differences between the students who manifest a satisfactory adjustment by continuing in their original program, students who change curriculum, and students who discontinue college.

The temptation in formulating the hypotheses is to directionalize all results. However, not enough is known about the interest patterns of associate and technical degree aspiring students to warrant such refinement. Therefore the hypotheses are stated in the null form:

1. There will be no differences in measured interest patterns between students entering discrepant associate degree and technical programs.
2. There will be no differences in ability scores between students entering discrepant associate degree and technical programs.
3. There will be no differences in high school grades between students entering discrepant associate degree and technical programs.
4. There will be no differences in ability level between students who successfully complete their original program,

those students who make a major change, or students who discontinue. (This hypothesis will be examined for each of the five curriculum groups involved in the study.)

5. There will be no differences in measured interest patterns between students who successfully complete their original program, those students who make a major change of program, or students who discontinue. (This hypothesis will be examined for each of the five curriculum groups involved in the study.)

6. There will be no differences in high school grades between those students who successfully complete their original program, those students who make a major change, or students who discontinue. (This hypothesis will be examined for each of the five curriculum groups involved in the study.)

The results of the analysis of these hypotheses may lead to an examination of the following questions:

1. Is there a difference in interest patterns and ability level of students with above and below a "C" average, who discontinue college?

2. Is there a difference in interest patterns and ability level of students with above and below a "C" average, who make a major change of curriculum?

3. Will students who make a major change of curriculum change into programs which could be related to primary, secondary, neutral or reject interest areas?

## Instrumentation and Demographic Data

Two standardized instruments (School and College Ability Test and Strong Vocational Interest Blank-For Men) were used as part of the placement test battery administered prior to the actual entrance of the study population in the fall of 1965. A change of curriculum and withdrawal questionnaire were developed for the purpose of this study. (Copies of these withdrawal and change of curriculum questionnaires are reproduced in Appendix A.)

Ability measure. The School and College Ability Test, Form 1A (SCAT) consists of 60 verbal and 50 quantitative items; total 110. The verbal subtest measures vocabulary and reading comprehension. The quantitative subtest measures arithmetic reasoning and understanding of arithmetic operations. A major intention of the test is to measure school learned abilities that are critical to success in college.

Interest measure. The Strong Vocational Interest Blank (Experimental)-For Men (SVIB) consists of 405 items grouped in eight parts. The alternative responses for each item of the first five parts are "Like", "Indifferent", and "Dislike". Each of these five parts is concerned with one of the following five categories: (1) occupations, (2) school subject, (3) amusements, (4) pecularities of people, and (5) miscellaneous. The last three parts require the subject to rank given activities in order of preference, compare his interest on pairs of items, and rate his present abilities and other characteristics.

Campbell (1966) reported that in 1959 all of Strong's original criterion data, consisting of about 40,000 completed inventories, were transferred to Minnesota and prepared for computer input and analysis. As a result of several studies involving this analysis, the following decisions and actions were indicated.

First, slightly over 100 of the 400 items in the booklet have been replaced with new items. The items replaced were those that were out of date or ones that did not differentiate between occupational groupings.

Second, for the immediate future, the scales will be based on the 300 unchanged items. All the original item analysis has been completed to make this possible.

Third, the scoring system has been simplified, both by reducing the number of items that appear on each scale and by reducing the range of item weights from plus or minus four to plus or minus one.

Fourth, the majority of the scales will be based on the criterion groups tested by Strong in the 1930's.

Fifth, the composition of the men-in-general reference group has been changed to include a sampling of individuals from a wide variety of occupations tested throughout the period 1925 to 1965.

Sixth, a number of new scales have been added to the profile and a few old ones have been dropped. Group III, which formerly included only the production management scale now includes three other scales and has been labeled as a direct interest in technical supervision. Group VI, (formerly a single scale, musician-performer) has also been expanded and identified as a general cultural-aesthetic group. The Interest Maturity Scale was eliminated because of lack of verification by validity studies.

Seventh, a number of minor changes have been made for practical purposes. The shaded area on the profile (chance area) has been adjusted to represent the middle third of the men-in-general distribution. The range of scores on the profile has been decreased from a -10 to 75 to 0 to 65, (this gives more prominence to high and low scores).

The length of the inventory has been decreased by one item from 400 to 399. (Note....experimental SVIB used in this study had 405 items, however, since the analysis has been done only on the original 300 items no significant problems of generalization from results of this study to other users of the new SVIB are anticipated.

Finally, a new non-occupational scale related to academic performance has been added. This scale, titled the Academic Achievement Scale, correlates about .35 with college grades and is related to persistence in college. The academic achievement scale was not available for use in this particular study.

High school cumulative honor point average (CHPA). Grade point averages were calculated from the last two academic subjects in four areas; (English, social science, mathematics, and science). Transcripts, forwarded from the student's high school provided this data.

Change of curriculum questionnaire. A change of curriculum questionnaire was developed in an attempt to examine the reason or reasons which students expressed as most important in affecting change. Previous studies, (Pierson, 1962; Holland and Nichols, 1964; Summerskill, 1962; Iffert, 1958; and Clark, 1960), provided a basic list from which items were obtained. A local study of withdrawal and change rates at Ferris State College, (Taylor, 1964) further refined the list. An initial questionnaire including all of the reasons listed in the above studies was developed. This list was refined to those reasons cited with a frequency of 5 percent or more by Ferris students in the local study. A copy of the questionnaire can be found in Appendix A.

Withdrawal questionnaire. The withdrawal questionnaire was developed to examine the reason or reasons which students felt to be most important in affecting their decision to withdraw from college. An additional procedure to that employed in developing the change of curriculum questionnaire was employed in developing the withdrawal questionnaire. A copy of this questionnaire can be found in Appendix A.

## Institutional Setting and Programming

All students included in the study enrolled at Ferris State College in the fall of 1965. Ferris State College practices a relatively open admission policy with students being eligible for admission irrespective of past educational record. Programs at non-collegiate technical, associate degree, and pre-professional levels, as well as programs at the baccalaureate degree level, are offered. Total college enrollment for 1965-1966 school year was approximately 6,200 students. Approximately one-third of these students were enrolled in each of the following three classifications of curricula-two year technical, pre-professional, and baccalaureate degree. Students included in this study were enrolled specifically in one of the following five general curricula classifications.

1. Trade and Industrial Programs (T&I): Architectural Drafting, Auto Body and Fender Repair and Painting, Auto Machine Shop, Automotive Service, Heavy Equipment and Diesel Repair, Machine Tool, Mechanical Drafting, Printing (General), Printing (Management and Supervision), Radio-Television Repair, Transmitter Service, Refrigeration Air Conditioning and Heating, Graphic Reproduction Technology, and Welding are offered at this level. In these programs from 45 to 75 percent of the student's instructional credit is in a shop course in his major area. The remaining instructional time is in standard academic courses either related to his major or of a general educational nature. None of the work completed in these programs normally transfers to baccalaureate programs. The programs range in length from four to eight terms (quarter system).

2. Collegiate Technical Programs (CTD): Commercial Art Technology, Environmental Sanitation Assisting, Food Service, Industrial Chemistry Technology, Optical Technology, Surveying and Topographical Drafting, Technical Illustration, and Industrial Production Technology are offered at this level. Major course descriptions of these programs typify those offered in college curricula. All programs involve technical aspects, carry regular college credit, and lead to the Associate in Applied Science Degree. Normal completion time is eight quarters.

3. Terminal Business Administration Programs (TB): Higher Accounting, Marketing and Retailing, Business Data Processing, Basic Business, and Small Business Management are offered at this level. These programs have a normal completion time of from four to six quarters. All courses carry regular college credit. An Associate in Applied Science Degree or certificate of completion can be earned in all the programs.

4. General Education Pre-Science Programs (GES): This level of program is typical of the pre-professional offerings at a junior college. Specific programs offered are: Pre-Denistry, Pre-Engineering, Pre-Medical Tech, Pre-Medicine, Pre-Mortuary Science, Pre-Nursing, Pre-Veterinarian Medicine, General Studies (Pharmacy), General Studies (Science).

5. General Education Non-Science Programs (GENS): This level of program is typical of the pre-professional offering at a junior college. Specific programs offered are: Pre-Arts, Pre-Law, Pre-Social Work, Pre-Teaching (Elementary), Pre-Teaching (Secondary) and General Studies (Non-Science).

## The Sample

The sample was first quarter male freshmen entering Ferris State College in the fall of 1965 in one of the programs described. Transfer students, women, as well as students for whom complete test data was not available were deleted from the study. The final obtained sample size for the five program areas involved in this study is presented in Table 2.1.

TABLE 2.1. SUMMARY OF THE SAMPLE SIZE FOR FIVE TWO YEAR PROGRAMS

| Program | | Sample |
|---|---|---|
| Collegiate Technical Program (CTD) | | 95 |
| Terminal Business Program (TB) | | 146 |
| General Education Science Program (GES) | | 130 |
| General Education Non-Science Program (GENS) | | 274 |
| Trade and Industrial Program (T&I) | | 296 |
| | TOTAL | 941 |

The classification problem faced in the second phase of this study was exceedingly complex. For example, what if a student transfers to another college and continues in either a similar program or some other program dissimilar to his original program? Should he be classified as a withdrawal, completion, or change? Another problem which had to be faced was that student who continued or changed programs at Ferris State College but while academically successful was still short of graduation. Also, if possible, this study attempted to differentiate between students who withdrew and were academically successful and those who withdrew but were academically unsuccessful. In an attempt to cope with these problems it was decided to generically define all the potential outcome categories.

*Generic definitions of outcome categories*. The following outcome categories were established to describe the status of students at the cessation of the study.

1. Completion of original program or continuation in good standing.* Students who have completed the program originally entered or who were continuing in this program at the cessation of the study. Completion or continuation can be at Ferris State College or at another school.

2. Alternate Program.** Students who completed or who were continuing in an alternate program at the cessation of the study. This also includes students who eventually withdrew from an alternate program.

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*In order to maximally purify the outcome categories to which students were assigned, a follow-up of the students who withdrew from Ferris State College and requested that transcripts of grades be forwarded to another college was conducted. If these students had completed a program at this second college, or were continuing with a GPA of 2.00 or above at the cessation of the study, they were assigned to the completion or continuation group. If these students had not completed a program and were continuing with a GPA of 1.99 or below at the second college, they reverted back to the withdrawal category.

**In addition to the difficulties inherent in classifying educational goals, the tendency of colleges to assign specific programs to general categories on a somewhat arbitrary basis complicates this problem. The intention of the authors was to study changes in educational goals that would be considered truely basic in nature. Also, from a practical point of view, the authors were forced to accept the general classification of specific educational programs utilized by Ferris State College.

Consequently, students who changed specific programs at Ferris were considered as having changed educational goal if the change involved a move from one of the major curriculum classifications developed for the study, (General Education Science, General Education Non-Science, Commerce, Trade and Industry, Collegiate Technical) to another of these curriculum classifications or to another major curriculum classification as defined by the college (Pharmacy, Specialized Education-Commercial). Students who changed to a program that was definitely implied as an education choice at the time of original enrollment, (as from Pre-Teaching to Teaching) were not considered as having made a change in choice of educational goal.

In evaluating for possible change of educational goal when students transferred to another school, judgement based upon the above criteria was made. If the program pursued at the school transferred to was offered at the same level as previous program (non-collegiate, associate degree, baccalaureate degree) and was in the same general subject area as the previous program at Ferris State College, (General Education Science, Non-Science, etc), no change was considered to have taken place. If the new program involved a change in level of program, a new subject area, a change in educational goal was considered to have taken place.

3. Withdrawals. Any student who withdrew from his original program and not re-enrolled, transferred, or changed programs before the cessation of the study.

The number of students who continued in the original program, withdrew, or changed programs is presented in Table 2.2.

TABLE 2.2. SUMMARY OF WITHDRAWAL, CHANGE OF CURRICULUM, AND COMPLETION OR CONTINUATION SAMPLE SIZE FOR FIVE TWO YEAR PROGRAMS*

| | CTD | TB | GES | GENS | T&I | Total |
|---|---|---|---|---|---|---|
| Completion-Original | 43 | 57 | 43 | 102 | 174 | 419 |
| Alternate Program | 16 | 17 | 32 | 47 | 23 | 135 |
| Withdrawals | 36 | 72 | 55 | 125 | 99 | 387 |
| TOTAL | 95 | 146 | 130 | 274 | 296 | 941 |

*Students who cited transfer as a reason for withdrawal were followed and placed in one of the categories indicated in Table 2.2 for statistical analysis.

Nine hundred fifty-four men students enrolled in the five discrepant associate degree programs at Ferris State College. The statistical analysis, because of incomplete or involved data, was based on a sample of 940 for phase one and 936 for phase two.

## Statistical Procedures

Two basic statistical procedures, factor analysis and analysis of variance were employed. In preparation for the factor analysis an intercorrelational matrix, using the Pearson Product Moment Correlations Technique was tabulated for the total sample and also for each of the five curricula areas. All dependent variables (SVIB scales, SCAT Verbal, Quantitative and Total scores, and the high school grade average) were included in a matrix. This procedure produced a 63 x 940 matrix (63 variables and 940 individuals) for the phase on analysis. This procedure was repeated for each curriculum group producing matrices of 63 x 95 for the Collegiate Technical sample, 63 x 148 for the Terminal Business sample, 63 x 130 for the General Education Science sample, 63 x 274 for the General Education Non-Science sample, and 63 x 296 for the Trade and Industrial sample for phase two analysis. These intercorrelational matrices were then available for a factor analysis procedure.

Cattell defends the use of product moment coefficient by stating, "Neither the product moment nor the principles of factor analysis assume or require a normal distribution....As Thurstone points out (126), the nature of the factors is remarkably immune to distorted distributions or crude coefficients."[2]

Extraction solution. A number of methods for factoring a matrix were available. However, only the principal axis solution is mathemtatically precise.[3] This method extracts all the variance presented by an intercorrelation. Other methods leave residual correlations. Because of its precision, the principal axis solution was used.

A factor analysis was conducted on each of the available intercorrelational matrices. The principal components and orthogonal rotations procedure available at the Michigan State University Computer Institute for Social Science Research provided for factor analysis program.

The mathematics of the reduction of a matrix into factors rests on the assumption that the total intercorrelational variance can be divided into independent sets. The independent sets of variance represent factors of the number of orthogonal dimensions of geometric space necessary to account for a matrix of intercorrelations. It is not required that the correlations be normally distributed, nor is it required that the population from which the correlations are obtained be normally distributed.[4]

Rotation of the factors. Thurstone propounded that simple structure is the most widely used and widely practicable criterion for finding a uniquely meaningful position; Cattell state that:

> According to this axiom if we have several alternative hypotheses each fitting equally the given factors, we should decide among them by taking that which is the simpliest i.e., that which requires fewest conditions and least bolstering by supplementary hypothesis.

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[2] Cattell, Raymond B., Factor Analysis, Harper Brothers, New York, 1952, p. 328.

[3] Ibid., p. 328.

[4] Ibid., pp. 34-35, 129-197, and 328.

> In terms of factor analysis, Thurstone argued, this means that anyone's test should have the simplest possible factor constitution....This means in terms the factor matrix that every test should have some zeros in its row i.e., that some factor should not load it, and that every factor should have some zeros in the column i.e.....that not all the test should be affected by it.
>
> In a factor analytic solution rotated to simple structure there is actually a double application of the simplicity or parsimony principle. First we have represented many variables by a few common factors and secondly we have distributed these factors to give the simplest explanation for that number of factors.[5]

The purposes of the factor analysis were to ascertain the structure of the interest, ability, and achievement complex under study and as a method of variable reduction. Therefore, it was desirable that a method of rotation by used so that the factors could be interpreted. The Neuhaus and Wrigley[6] method of rotation was used because it achieves Thurstones[7] criteria with acceptable precision.

Only those factors which had a sum of squares (Eigen Value) in excess of one were rotated. The rotations were continued until the number of variables loading on a factor was equal to N-1; N being the number of rotations. Furthermore, variables contained in a factor were interpreted with extreme caution if their highest loading on that factor fell below .50.

### Analysis of Variance

The second basic statistical procedure employed was analysis of variance. A simple one by five factorial design was utilized in the first phase of the study in which the five curriculum groupings were compared on factors derived from factor analysis of data for the total sample. For the second phase of the study, a one by three factorial design was used to compare the scores for each of the three outcome groups on the factors derived through factor analysis of data for the respective curriculum grouping.

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[5] Ibid., p. 67.

[6] Neuhaus, J. O. and Wrigley, Charles, "The Quartimax Method, An Analytical Approach to Orthogonal Simple Structure," British Journal of Statistical Psychology, 1954, Vol. 7, pp. 89-91.

[7] Thurstone proposed that for the factor matrix every item should have some zeros in its raw (meaning that some of the other factors should not correlate with the item) and that every factor should have some zeros in its column indicating the factor does not affect all variables. For a more complete discussion of this problem see Cattell, op. cit., pp. 67-68.

The posteriori tests employed to determine which means within a significant variable differed significantly were the Duncan Range and Scheffe's Method. Duncan's "Significance Test for Differences Between Ranked Treatments in an Analysis of Variance"[8] was employed in phase one of the study primarily because of its ease of computation. As unequal n's were involved in the major curriculum groupings, the smallest sample n (CTD = 95) was used to compute the Duncan ranges. This resulted in somewhat severe test for significance of difference between means. In light of sample size this did not pose an overwhelming problem.

In determining significance of differences between means in phase two of the study, minimum sample size (CTD-alternate program = 16) presented a problem. Consequently Scheffe's Method[9] of post hoc analysis was utilized. Scheffe's Method involves individual computations, each based on actual sample size.

A confidence level of probability equal to .05 was established in determining statistical significance for each of the analyses of variance. If the variance in any comparison was found to be statistically significant in the first phase of the study, a Duncan Range at the .01 probability level was used to determine statistical significance between means. In phase two of the study, a Scheffe's at the .10 probability level was used to determine statistical significance between means following the finding of significance of the variable through the analysis of variance.

## Phases of the Study

To enhance the presentation and analysis of the results the study is presented in two phases. The first phase is concerned with students at the time of initial enrollment at Ferris State College and those students entering each curriculum classification are compared on the dependent variables. To accomplish this task, the previously described factor analytic procedures were employed to identify factors common to the total sample. Mean scores on these common factors for each of the curriculum groups were compared using the analysis of variance and Duncan Range Test to determine statistical significance of difference.

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[8] Duncan, D. B., "A Significance Test for Differences Between Ranked Treatments in an Analysis of Variance," The Virginia J. of Science, 1951, 2(new series), pp. 171-189.

[9] Winer, B. J., Statistical Principles in Experimental Design, McGraw-Hill Company, Inc., New York, 1962, p. 88.

Phase two of the study was concerned with students who fall into each of the outcome groups described previously. Again, factor analysis was employed to define factors common to all students within each curriculum group. The analysis of variance was employed to determine statistical significance of variables. Because of the low n's in certain outcome categories, Scheffe's Method of post hoc analysis was used to determine statistical significance between means.

# CHAPTER III

## RESULTS I

## INTEREST, ABILITY, AND ACHIEVEMENT FACTORS RELATED TO ENTRY INTO ONE OF FIVE DISCREPANT TECHNICAL OR ASSOCIATE DEGREE PROGRAMS

The first phase of this study is concerned with comparing and contrasting high school grades, ability test scores, and interest profiles of the students enrolling in each of the five major curriculum groupings. These comparisons encompass the first three hypotheses:

1. There will be no differences in measured interest patterns between students entering discrepant associate degree and technical programs.

2. There will be no differences in ability scores between students entering discrepant associate degree and technical programs.

3. There will be no differences in high school grades between students entering discrepant associate degree and technical programs.

It seems reasonable to assume that one of the major problems confronting high school and college counselors is effectively identifying common characteristics of students selecting various programs and fields. It would also seem that progress toward solution of this problem could be accomplished if one were to compare the high school grades, ability scores, and interest profiles of post high school students who commit themselves to discrepant education and vocational programs.

The statistical technique that seemed to lend itself most to accomplishing this end and would allow an opportunity for an interpretative examination of the variables was the factor analysis method already described in chapter two. The first step was to obtain a total project men-in-general group of factors. Through procedures outlined previously, four were found to account for a majority of the intercorrelational variance. When possible and appropriate these general factors were labeled and an attempt made to describe the factor in psychological meaningful term. The factor analysis was based on the sample of 941 students on which complete data was available.

## Description of the Factors for the Total Group

As cited above, four factors were found to account for the majority of variance within the total group. Summaries of these factors are presented in Table 3.1 through 3.4.

The interest scales loading highest on factor I, which are presented in Table 3.1, seem to primarily emphasize occupations of a social service nature. The nature of the work engaged in would be strongly interpersonal in nature. People considering these occupations would likely be concerned with working with and helping individuals in a problem solving or developmental sense.

TABLE 3.1. SUMMARY OF INTEREST SCALES LOADING HIGHEST ON FACTOR I - SOCIAL SERVICE

| | Scales | Factor Loading | Total Group Mean |
|---|---|---|---|
| 1. | Physical Therapist | -.716 | 29.9 |
| 2. | Optometrist | -.747 | 30.5 |
| 3. | Public Administrator | -.778 | 27.2 |
| 4. | Minister | -.805 | 13.9 |
| 5. | YMCA Physi. Director | -.824 | 24.4 |
| 6. | Music Teacher | -.828 | 24.0 |
| 7. | School Superintendent | -.845 | 17.3 |
| 8. | Social Science Teacher | -.861 | 30.0 |
| 9. | Credit Manager | -.864 | 31.8 |
| 10. | Bus. Educ. Teacher | -.865 | 29.3 |
| 11. | Personnel Director | -.872 | 25.1 |
| 12. | Rehabilitation Counselor | -.884 | 25.3 |
| 13. | Chamber of Commerce Exec. | -.898 | 30.4 |
| 14. | YMCA Secretary | -.914 | 18.5 |
| 15. | Social Worker | -.939 | 20.4 |
| 16. | Specialization Level | -.611 | 31.0 |

The second factor is bipolar in nature. The scales loading in the positive direction suggest a strong biological-physical science emphasis, i.e., biologist, physician, psychologist, and mathematician. Occupational scales loading in this direction also seem to have an educational emphasis that is beyond the four year degree level. Even those occupations such as musician performer, artist, and art teacher typically require long years of study and continued training beyond the minimum entrance requirements of these fields. The primary emphasis seems to be on the meaning and understanding of symbols and abstract concepts. The scales, factor loadings, and mean scores for factor II are presented in Table 3.2.

TABLE 3.2. SUMMARY OF INTEREST SCALES LOADING HIGHEST ON FACTOR II - BIOLOGICAL - PHYSICAL SCIENCE VS BUSINESS MANAGEMENT

| Scales | Factor Loading | Total Group Mean |
|---|---|---|
| 1. Biologist | .879 | 20.4 |
| 2. Physician | .823 | 28.3 |
| 3. Musician Performer | .819 | 34.4 |
| 4. Psychologist | .729 | 17.6 |
| 5. Art Teacher | .718 | 18.9 |
| 6. Artist | .710 | 26.6 |
| 7. Mathematician | .701 | 20.6 |
| 8. Psychiatrist | .697 | 21.1 |
| 9. Architect | .688 | 28.4 |
| 10. Dentist | .666 | 29.4 |
| 11. Chemist | .655 | 26.5 |
| 12. Librarian | .646 | 40.6 |
| 13. Physicist | .557 | 12.4 |
| 14. Osteopath | .482 | 29.9 |
| 15. Pharmacist | -.229 | 35.6 |
| 16. Pres. Manufacturing Concern | -.490 | 25.8 |
| 17. Office Worker | -.600 | 35.9 |
| 18. Moritician | -.607 | 35.8 |
| 19. Sales Manager | -.615 | 30.4 |
| 20. Real Estate Salesman | -.646 | 40.6 |
| 21. Banker | -.731 | 33.9 |
| 22. Purchasing Agent | -.764 | 37.4 |

In the negative direction are found business related occupations with an emphasis on business management relationships. These factor II scales suggest an interest in dealing with people on a fairly practical level to accomplish a purpose such as the sale of a product or service.

Factor III is also bipolar in nature. The positive pole seems related to technical, physically active occupations. Individuals involved in these occupations would likely be interested in work in an applied manipulative sense and in the application of technical skills to problem solving.

The occupations loading in the negative direction on this factor reflect a verbal-linguistic aspect to work. The emphasis is upon the use of written and oral communication in accomplishing a purpose.

TABLE 3.3. SUMMARY OF INTEREST SCALES LOADING HIGHEST ON FACTOR III - TECHNICAL VS VERBAL-LINGUISTIC

| Scales | Factor Loading | Total Group Mean |
|---|---|---|
| 1. Industrial Arts Teacher | .845 | 30.7 |
| 2. Airplane Pilot | .804 | 37.6 |
| 3. Carpenter | .782 | 32.1 |
| 4. Masculinity-Femininity | .774 | 50.3 |
| 5. Farmer | .752 | 41.1 |
| 6. Forest Service Man | .747 | 27.9 |
| 7. Policeman | .715 | 35.1 |
| 8. Math-Science Teacher | .667 | 33.3 |
| 9. Army Officer | .654 | 25.6 |
| 10. Veterinarian | .634 | 31.9 |
| 11. Production Manager | .608 | 34.1 |
| 12. Engineer | .582 | 30.1 |
| 13. Printer | .527 | 38.3 |
| 14. Senior C.P.A. | .492 | 32.8 |
| 15. Life Insurance Salesman | -.621 | 29.7 |
| 16. Occupational Level | -.638 | 47.7 |
| 17. Author-Journalist | -.659 | 29.7 |
| 18. Lawyer | -.766 | 28.0 |
| 19. Advertising Man | -.798 | 29.8 |

The final factor, presented in Table 3.4 is a bipolar factor with intellectual scales, all three SCAT scores and high school grades loading in a positive direction. Two interest scales, C.P.A.-owner and accountant load in the negative direction on this factor. Other than their obvious math-computational orientation, they do not seem to have any additional interpretive value.

TABLE 3.4. SUMMARY OF INTEREST SCALES AND ABILITY MEASURES LOADING HIGHEST ON FACTOR IV - COMPUTATIONAL-INTELLECTUAL

| Interest Scales & Ability Measures | Factor Loading | Total Group Mean |
|---|---|---|
| 1. SCAT T | .594 | 60.5 |
| 2. SCAT Q | .581 | 33.0 |
| 3. SCAT V | .436 | 27.7 |
| 4. HS GPA | .318 | 1.95 |
| 5. Accountant | -.515 | 26.5 |
| 6. C.P.A. Owner | -.688 | 19.2 |

## Redefinition of Factors for the Project Men-In-General Group

After the project men-in-general factors were identified, the analysis of variance and Duncan range techniques were used to test the hypotheses being examined in this phase of the study. Duncan's (1951) Range Test provided an opportunity to examine significant differences between students in the five technical and associate degree programs using the general factors already identified as a framework. Since the basic hypotheses to be tested were directly concerned with the relationship between high school grades, ability, and interest and initial program selection, the four basic factors were expanded to take into account the hypotheses to be tested. Since the interpretative emphasis of the first four factors were occupational interests, there were no basic changes in their interpretation. Specialization level scale (originally in factor I) was redefined as factor V, masculinity-femininity as factor VI, and occupational level as factor VII. The latter two loaded highest in the original factor III. The four intellectual scales in factor IV were redefined as individual factors allowing an opportunity to look at the specific aspects of intellectual functioning in terms of initial program enrolled in. SCAT V was now defined as factor VIII, SCAT Q factor IX, SCAT T factor X and HS GPA factor XI. When necessary the mean scale scores were summated (factor I-IV) and the analysis of variance technique was used to examine the differences between the summed mean score for each respective curriculum group.

A second revision of the original four total group factors involved splitting the bipolar factors into their positive and negative components. It was felt that this revision would add to the meaningfulness of results. The redefinition of factors resulted in a total of eleven factors as compared to the original four. Results given in this section are based upon a total of 940 observations.

The first four factors relate to hypothesis one: There will be no differences in measured interest patterns between male students entering discrepant associate degree and technical programs.

Factor V, VI, and VII are interest related factors.

Factor VIII, IX, and X relate to hypothesis two: There will be no differences in ability scores or the variability of ability scores between male students entering discrepant associate degree and technical programs.

Factor XI relate to hypothesis three: There will be no differences in high school grades between male students entering discrepant associate degree and technical programs.

Table 3.5 presents a list of the redefined factors for the total project men-in-general group.

TABLE 3.5. REDEFINED MEN-IN-GENERAL FACTORS FOR ANALYSIS OF VARIANCE

| | |
|---|---|
| Occupational Factors | |
| Factor I | (Social Service) |
| Factor IIA | (Biological-Physical Science) |
| Factor IIB | (Business Management) |
| Factor IIIA | (Technical) |
| Factor IIIB | (Verbal-Linguistic) |
| Factor IV | (Computational) |
| Interest Related Factors | |
| Factor V | (Specialization Level) |
| Factor VI | (Occupational Level) |
| Factor VII | (Masculinity-Femininity) |
| Ability and Achievement Factors | |
| Factor VIII | (SCAT-Verbal) |
| Factor IX | (SCAT-Quantitative) |
| Factor X | (Scat-Total) |
| Factor XI | (High School GPA) |

## Comparison of Curriculum Groups on Interest Factors

Factor I - Social Service. Scales loading on factor I and the results of analysis of variance and Duncan Range test comparing the mean scores of the five groups for factor V are presented in Table 3.6.

Examination of the Table 3.6 indicates that the General Education Non-Science students have the highest group mean on this factor and the Trade and Industrial students the lowest. The Trade and Industrial, Collegiate Technical Division, and General Education Science do not differ significantly at the .01 level of confidence on this factor. This implies that students entering technical-science oriented programs tend to be neutral or rejecting of occupations suggested by factor I. The General Education Science, Terminal Business, and General Education Non-Science students also are not significantly different from each other on this factor. The Terminal Business, and General Education Non-Science students have significantly higher mean scores on this factor than Trade and Industrial and Collegiate Technical students. It might be postulated that the more technical the interest the more rejecting the person becomes of social service, other people oriented occupations. Conversely, the more liberal arts oriented the program the more the person becomes identified with social service related occupations.

TABLE 3.6. SUMMARY OF INTEREST SCALES LOADING HIGHEST ON THE REDEFINED FACTOR I - SOCIAL SERVICE

| | Scale | Factor Loading | Total Group Mean |
|---|---|---|---|
| 1. | Social Worker | -.939 | 20.4 |
| 2. | YMCA Secretary | -.914 | 18.5 |
| 3. | Chamber of Commerce Exec. | -.898 | 30.4 |
| 4. | Rehabilitation Counselor | -.884 | 25.3 |
| 5. | Personnel Director | -.872 | 25.1 |
| 6. | Bus. Educ. Teacher | -.865 | 29.3 |
| 7. | Credit Manager | -.864 | 31.8 |
| 8. | Soc. Science Teacher | -.861 | 30.0 |
| 9. | School Superintendent | -.845 | 17.3 |
| 10. | Music Teacher | -.828 | 24.0 |
| 11. | YMCA Phys. Director | -.824 | 24.4 |
| 12. | Minister | -.805 | 13.9 |
| 13. | Public Administrator | -.778 | 27.2 |
| 14. | Optometrist | -.747 | 30.5 |
| 15. | Physical Therapist | -.716 | 29.9 |

Analysis of Variance for Factor I

| Source of Variance | Sum of Squares | Degs. of Freedom | Mean Square | F Statistics | Approx. Probability |
|---|---|---|---|---|---|
| Between | 1178455.06 | 4 | 294613.77 | 15.55 | 0.00 |
| Within | 17711978.79 | 935 | 18943.29 | | |
| Total | 18890433.85 | 939 | | | |

Duncan Multiple Range Test

| Curriculum Group: | Trade & Industrial | Collegiate Tech. | Gen. Educ. Science | Terminal Business | Gen. Educ. Non-Science |
|---|---|---|---|---|---|
| Mean:* | 338.01 | 345.85 | 368.66 | 403.39 | 420.68 |

*Means with common underlining do not differ significantly at the .01 probability level. Means not commonly underlined differ significantly at the .01 probability level.

Certain of the interest factors found by factor analysis of the men-in-general group of students were bipolar in nature. Therefore, when a factor had positive and negative loadings implying a continuing of interests from one pole to another, the analysis of variance technique was used to examine the occupations in each of these categories separately. This prevented positive and negative loadings from cancelling each other out, and also enabled the authors to note the directional loading of divisional groups on occupation scales within these interest factors. Factors II and III are bipolar.

Factor II A - Biological-Physical Science. The occupational scales and results of analysis of variance for the positive pole of factor II are presented in Table 3.7.

Students in General Education Science had the highest group mean on the positive pole of factor II and Terminal Business students the lowest mean. The Trade and Industrial, Collegiate Technical Division, and General Education Science students have a significantly higher group mean than General Education Non-Science, Trade and Industrial, and Collegiate Technical Division students. The General Education Science students have a significantly higher group mean than General Education Non-Science and Terminal Business students. The Terminal Business students group mean also is significantly lower than the students in the other four programs. The results of this analysis of variance seems very apparent, the stronger the science orientation the more a student identifies with biological-physical science occupations. It appears that students entering Terminal Business programs tend to reject these types of occupations. The weaker his science orientation, as in the case of Terminal Business students, the less he identifies with occupations in the physical and biological science.

Whereas the Terminal Business students had the lowest group mean and the General Education Science students the highest group mean on the positive pole of factor II. The reverse was true for the negative pole of factor II with Terminal Business students having the highest and General Education Science students the lowest mean. This negative pole of factor II does not differentiate between students entering General Education Science, Trade and Industrial, Collegiate Technical Division, and General Education Non-Science. However, Terminal Business students have significantly higher mean scores than the remaining four groups. The implication is that students entering Terminal Business programs have a much stronger interest in occupations emphasizing orderliness, detail and management concerns than students entering other programs.

TABLE 3.7. SUMMARY OF INTEREST SCALES LOADING HIGHEST ON THE REDEFINED FACTOR II A - BIOLOGICAL-PHYSICAL SCIENCE

| Scale | Factor Loading | Total Group Mean |
|---|---|---|
| 1. Biologist | .879 | 20.4 |
| 2. Physician | .823 | 28.3 |
| 3. Musician Performer | .819 | 34.4 |
| 4. Psychologist | .729 | 17.6 |
| 5. Art Teacher | .718 | 18.9 |
| 6. Artist | .710 | 26.6 |
| 7. Mathematician | .701 | 20.6 |
| 8. Psychiatrist | .697 | 21.1 |
| 9. Architect | .688 | 28.4 |
| 10. Dentist | .666 | 29.4 |
| 11. Chemist | .655 | 26.5 |
| 12. Librarian | .646 | 18.8 |
| 13. Physicist | .557 | 12.4 |
| 14. Osteopath | .482 | 29.9 |

Analysis of Variance for Factor II A

| Source of Variance | Sum of Squares | Degs. of Freedom | Mean Square | F Statistics | Approx. Probability |
|---|---|---|---|---|---|
| Between | 2283698.04 | 4 | 570924.51 | 58.58 | 0.00 |
| Within | 9112595.09 | 935 | 9746.09 | | |
| Total | 11396293.13 | 939 | | | |

Duncan Multiple Range Test

| Curriculum Group: | Terminal Business | Gen. Educ. Non-Science | Trade & Industrial | Collegiate Tech. | Gen. Educ. Science |
|---|---|---|---|---|---|
| Mean:* | 230.10 | 328.32 | 360.59 | 365.19 | 390.52 |

*Means with common underlining do not differ significantly at the .01 probability level. Means not commonly underlined differ significantly at the .01 probability level.

Factor II B - Business Management. The interest scales with a negative loading in factor II are presented in Table 3.8.

TABLE 3.8. SUMMARY OF INTEREST SCALES LOADING HIGHEST ON THE REDEFINED FACTOR II B - BUSINESS MANAGEMENT

| Scale | Factor Loading | Total Group Mean |
|---|---|---|
| 1. Purchasing Agent | -.764 | 37.4 |
| 2. Banker | -.731 | 33.9 |
| 3. Real Estate Salesman | -.646 | 40.6 |
| 4. Sales Manager | -.615 | 30.4 |
| 5. Mortician | -.607 | 35.8 |
| 6. Office Worker | -.600 | 35.9 |
| 7. Pres. Mfg. Concern | -.490 | 25.8 |
| 8. Pharmacist | -.229 | 35.6 |

Analysis of Variance for Factor II B

| Source of Variance | Sum of Squares | Degs. of Freedom | Mean Square | F Statistics | Approx. Probability |
|---|---|---|---|---|---|
| Between | 536860.44 | 4 | 134215.11 | 61.92 | 0.00 |
| Within | 2026614.56 | 935 | 2167.50 | | |
| Total | 2563475.00 | 939 | | | |

Duncan Multiple Range Test

| Curriculum Group: | Gen. Educ. Science | Trade & Industrial | Collegiate Tech. | Gen. Educ. Non-Science | Terminal Business |
|---|---|---|---|---|---|
| Mean:* | 254.17 | 264.11 | 267.11 | 271.81 | 329.97 |

*Means with common underlining do not differ significantly at the .01 probability level. Means not commonly underlined differ significantly at the .01 probability level.

Factor III A - Technical. Factor III was also bipolar and again the factor was divided into positive and negative poles for purposes of analysis. The occupational scales with a positive loading and analysis of variance of mean scores are presented in Table 3.9.

As one might expect, the Trade and Industrial students have the highest mean score and the Terminal Business students the lowest mean score on this portion of factor III.

## TABLE 3.9. SUMMARY OF INTEREST SCALES LOADING HIGHEST ON THE REDEFINED FACTOR III A - TECHNICAL

| Scale | Factor Loading | Total Group Mean |
|---|---|---|
| 1. Industrial Arts Teacher | .845 | 30.7 |
| 2. Airplane Pilot | .804 | 37.6 |
| 3. Carpenter | .782 | 32.1 |
| 4. Farmer | .752 | 41.1 |
| 5. Forest Service Man | .747 | 27.9 |
| 6. Policeman | .715 | 35.1 |
| 7. Math-Science Teacher | .667 | 33.3 |
| 8. Army Officer | .654 | 25.6 |
| 9. Veterinarian | .634 | 31.9 |
| 10. Production Manager | .608 | 34.1 |
| 11. Engineer | .582 | 30.1 |
| 12. Printer | .527 | 38.3 |
| 13. Senior C.P.A. | .492 | 32.8 |

### Analysis of Variance for Factor III A

| Source of Variance | Sum of Squares | Degs. of Freedom | Mean Squares | F Statistics | Approx. Probability |
|---|---|---|---|---|---|
| Between | 1988114.04 | 4 | 497028.51 | 61.40 | 0.00 |
| Within | 7568365.22 | 935 | 8094.51 | | |
| Total | 9556479.25 | 939 | | | |

### Duncan Multiple Range Test

| Curriculum Group: | Terminal Business | Gen. Educ. Non-Science | Collegiate Tech. | Gen. Educ. Science | Trade & Industrial |
|---|---|---|---|---|---|
| Mean:* | 363.17 | 395.97 | 421.49 | 466.57 | 483.19 |

*Means with common underlining do not differ significantly at the .01 probability level. Means not commonly underlined differ significantly at the .01 probability level.

The mean score for Terminal Business students is significantly lower than those of Collegiate Technical Division, General Education Science, and Trade and Industrial students. General Education Non-

Science mean score is significantly lower than General Education Science and Trade and Industrial students. The mean score of Collegiate Technical students differs significantly for Terminal Business, General Education Science, and Trade and Industrial students. General Education Science and Trade and Industrial mean scores differ significantly from Terminal Business, General Education Science and Collegiate Technical Division. The positive portion of factor III seems to be the most discriminating of the factors examined. In every case means differed in three out of four comparisons. General Education Science and Trade and Industrial students seem to have the most favorable orientation to occupations with the least amount of enthusiasm.

Factor III B - Verbal Linguistic. The negative pole scales of factor III and the analysis of variance results are presented in Table 3.10.

TABLE 3.10. SUMMARY OF INTEREST SCALES LOADING HIGHEST ON THE REDEFINED FACTOR III B - VERBAL LINGUISTIC

| Scale | Factor Loading | Total Group Mean |
|---|---|---|
| 1. Advertising Man | -.798 | 29.8 |
| 2. Lawyer | -.766 | 28.0 |
| 3. Author-Journalist | -.659 | 29.3 |
| 4. Life Insurance Salesman | -.621 | 29.7 |

Analysis of Variance for Factor III B

| Source of Variance | Sum of Squares | Degs. of Freedom | Mean Squares | F Statistics | Approx. Probability |
|---|---|---|---|---|---|
| Between | 92635.42 | 4 | 23158.85 | 31.91 | 0.00 |
| Within | 678679.32 | 935 | 725.86 | | |
| Total | 771314.74 | 939 | | | |

Duncan Multiple Range Test

| Curriculum Group: | Trade & Industrial | Gen. Educ. Science | Collegiate Tech. | Terminal Business | Gen. Educ. Non-Science |
|---|---|---|---|---|---|
| Mean:* | 105.01 | 109.10 | 119.20 | 126.39 | 127.10 |

*Means within common underlining do not differ significantly at the .01 probability level. Means not commonly underlined differ significantly at the .01 probability level.

Trade and Industrial students have the lowest mean score on the negative portion of factor III and the General Education Non-Science students the highest mean score. The analysis of variance indicates that the Trade and Industrial means are significantly different from all other mean scores except those for the General Education Science sample. General Education Science mean score is significantly lower than Terminal Business and General Education Non-Science student means.

Collegiate Technical Division mean score differs significantly from only the Trade and Industrial mean score. The mean scores of Terminal Business and General Education Non-Science are significantly different from Trade and Industrial and General Education Science scores. A point that seems quite relevant is that Terminal Business and General Education Non-Science students have the strongest interest in occupations requiring verbal-linguistic skills and a generalized interest in working with people on a verbal level. On the other hand, Trade and Industrial and General Education Science students seem to have the least interest in occupations requiring this type of activity. As with the other bipolar factor, the group with the highest mean on the positive pole has the lowest mean on the negative pole.

Factor IV - Computational. Factor IV, occupation scales and analysis of variance means are presented in Table 3.11.

As one would expect, Terminal Business students have the highest group mean and Trade and Industrial students the lowest mean. This factor is able to significantly differentiate only Terminal Business students from all other groups. No other comparisons are significant. The suggestion is that Terminal Business students are more likely to have positive interest in occupations requiring computational skills.

TABLE 3.11. SUMMARY OF INTEREST SCALES LOADING HIGHEST ON THE REDEFINED FACTOR IV - COMPUTATIONAL

| Scale | Factor Loading | Total Group Mean |
|---|---|---|
| 1. C.P.A. Owner | -.688 | 19.2 |
| 2. Accountant | -.515 | 26.5 |

Analysis of Variance for Factor IV

| Source of Variance | Sum of Squares | Degs. of Freedom | Mean Squares | F Statistics | Approx. Probability |
|---|---|---|---|---|---|
| Between | 14957.14 | 4 | 3739.29 | 15.38 | 0.00 |
| Within | 227316.45 | 935 | 243.12 | | |
| Total | 242273.59 | 939 | | | |

Duncan Multiple Range Test

| Curriculum Group: | Trade & Industrial | Gen. Educ. Non-Science | Collegiate Tech. | Gen. Educ. Science | Terminal Business |
|---|---|---|---|---|---|
| Mean:* | 41.48 | 45.34 | 45.46 | 47.64 | 53.63 |

*Means within common underlining do not differ significantly at the .01 probability level. Means not commonly underlined differ significantly at the .01 probability level.

## Summary

It seems safe to say that the hypothesis that there would be no significant differences in interest patterns between the five curriculum groups can be rejected.

In all comparisons a significant difference between group means was observed. The more technical the program the less emphasis on social service related interests, and conversely the more liberal arts oriented the program the more apparent is the interest in "other people" occupations as was reflected in factor I. There is also a strong implication that students entering science related programs have much higher interest in physical-biological science occupations (factor II A) than do students entering business or liberal arts programs. These latter students tend to reject physical-biological science interest. Terminal Business students seem to be much more interested in occupations requiring orderliness and attention to detail and management concerns, as observed in factor IIB, that students in any of the other four curriculum groups. Students in General Education Science and Trade and Industrial programs are more interested in occupations involving technical skill and physical activity (factor IIIA). Terminal Business and General Education Non-Science studemts seem to have the least amount of enthusiasm about this type of occupational orientation. The Terminal Business and General Education Non-Science students have the strongest interest in occupations requiring verbal-linguistic skills and a need to work with people on a verbal level as indicated in factor IIIB. On the other hand, Trade and Industrial and General Education Science students have the least interest in this type of occupation. Finally, only Terminal Business students seemed to accept occupations requiring computational skills.

## Interest Related Factor Comparison of Curriculum Group

Factors V, VI, and VII are made up of the interest related scales associated with the SVIB and presented at the base of the profile sheet.[10] Campbell (1966) defined these scales in the following manner:

1. Specialization Level. Scores are apparently to a man's willingness to concentrate his occupational activities in a single field. Medical specialists were compared with general practitioners; the average specialist scores about 50, general practitioners about 40.

2. Occupational Level. This scale seems to be related to the socioeconomic "level of one's interests". Corporation presidents and city school superintendents average about 66, carpenters and printers about 49.

3. Masculinity-Femininity. This scale compares the interests of men and women; the average man scores 50 on the Men's profile. Those who score low, toward the "feminine" end, are simply reporting interest for art, books, music, for working inside, for being considerate of others, for keeping their hands clean; attributes more feminine than masculine in our society. High scores appear to be somewhat opposite of the above interpretation.

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[10] Strong, Edward K., Jr., Revised by David P. ampbell, Strong Vocational Interest Blank Manual, Stanford University Press, Stanford, California, 1966.

Factor V - Specialization Level. The scale mean and results of analysis of variance for factor V is presented in Table 3.12.

TABLE 3.12. SUMMARY OF INTEREST RELATED SCALE LOADING HIGHEST ON THE REDEFINED FACTOR V - SPECIALIZATION LEVEL

| Scale | Factor Loading | Total Group Mean |
|---|---|---|
| 1. Specialization Level | -.611 | 30.94 |

Analysis of Variance for Factor V

| Source of Variance | Sum of Squares | Degs. of Freedom | Mean Squares | F Statistics | Approx. Probability |
|---|---|---|---|---|---|
| Between | 796.58 | 4 | 192.40 | 2.85 | 0.02 |
| Within | 63038.86 | 935 | 67.42 | | |
| Total | 63808.45 | 939 | | | |

Duncan Multiple Range Test

| Curriculum Group: | Terminal Business | Trade & Industrial | Gen. Educ. Science | Collegiate Tech. | Gen. Educ. Non-Science |
|---|---|---|---|---|---|
| Mean: | 29.96 | 30.05 | 31.38 | 31.59 | 32.03 |

No significant differences found between any of the means.

The analysis of variance indicates a statistically significant difference at the .02 probability level. However, this significance is lost when differences are tested by the Duncan Range Test using the .01 probability level. Inspection of the data shows the actual sample mean varied from scores of 29 to 32. One could postulate that this does seem to be a significant difference from the mean scores of 40 for general practitioners and 50 for medical specialists reported by Campbell. Perhaps this specialization level score is related in part to the attained or aspired educational level reached by individuals. Or perhaps it implies that students entering technical or two year associate level programs are less willing to commit a vast amount of energy to any single specific goal.

_Factor VI_ - _Occupational Level_. The factor VI scale and analysis of variance is presented in Table 3.13.

TABLE 3.13. SUMMARY OF INTEREST RELATED SCALE LOADING HIGHEST ON THE REDEFINED FACTOR VI - OCCUPATIONAL LEVEL

| Scale | Factor Loading | Total Group Mean |
|---|---|---|
| 1. Occupational Level | -.638 | 47.73 |

Analysis of Variance for Factor VI

| Source of Variance | Sum of Squares | Degs. of Freedom | Mean Squares | F Statistics | Approx. Probability |
|---|---|---|---|---|---|
| Between | 6146.88 | 4 | 1536.72 | 3.33 | 0.00 |
| Within | 43128.76 | 935 | 46.12 | | |
| Total | 49275.64 | 939 | | | |

Duncan Multiple Range Test

| Curriculum Group: | Trade & Industrial | Gen. Educ. Science | Collegiate Tech. | Gen. Educ. Non-Science | Terminal Business |
|---|---|---|---|---|---|
| Means:* | 44.29 | 47.80 | 47.97 | 49.51 | 51.19 |

*Means with common underlining do not differ significantly at the .01 probability level. Means not commonly underlined differ significantly at the .01 probability level.

The occupational level scale does differentiate between the five curriculum groups. Trade and Industrial students had the lowest mean score, (significantly different from all other groups) and Terminal Business students the highest. Terminal Business students have a significantly higher mean score than all the other groups with the exception of General Education Non-Science. One observation would be that the higher socioeconomic aspirations are inversely related to technical-trade programs and directly related to business programs.

When viewed in comparison to Campbell's norm groups it seems that students in two year collegiate programs or less have interests more in common with carpenters and printers than with corporation presidents and city school superintendents.

Factor VII - Masculinity-Femininity. The masculinity-femininity scale (factor VII) differentiated between two curriculum group clusters; General Education Non-Science, Collegiate Technical Division and Terminal Business on the low end, and General Education Science and Trade and Industrial on the high end.

The scale and results of analysis of variance are presented in Table 3.14.

TABLE 3.14 SUMMARY OF INTEREST RELATED SCALE LOADING HIGHEST ON THE REDEFINED FACTOR VII - MASCULINITY-FEMININITY

| Scale | Factor Loading | Total Group Mean |
|---|---|---|
| 1. Masculinity-Femininity | .774 | 50.34 |

Analysis of Variance for Factor VII

| Source of Variance | Sum of Squares | Degs. of Freedom | Mean Squares | F Statistics | Approx. Probability |
|---|---|---|---|---|---|
| Between | 9184.43 | 4 | 2296.11 | 38.80 | 0.00 |
| Within | 55336.87 | 935 | 59.18 | | |
| Total | 64521.30 | 939 | | | |

Duncan Multiple Range Test

| Curriculum Group: | Gen. Educ. Non-Science | Collegiate Tech. | Terminal Business | Gen. Educ. Science | Trade & Industrial |
|---|---|---|---|---|---|
| Mean:* | 47.39 | 47.53 | 48.07 | 51.88 | 54.43 |

*Means with common underlining do not differ significantly at the .01 probability level. Means not commonly underlined differ significantly at the .01 probability level.

To stretch a point a bit, it could be observed that the more liberal arts oriented the college program the more "feminine" the interests and the more technical the program the more "masculine" the interests. All group means seem to range around the average men-in-general mean of 50 reported by Campbell.

## Summary

On the whole it seems safe to say that interest related factors seem to reject the hypothesis that no differences in interest would be found between the five curriculum groups. The specialization level scale, while not specifying any significant difference between curriculum groups in this study, does indicate a strong probability of a correlation between scores on this scale and educational aspiration. The occupational level scale does differentiate between the curriculum groups, but all the scores seem to be more related to technical-trade reference group occupations than to top management or administrative positions. The masculinity-femininity scale also differentiates between the curriculum groups with technical-science related students scoring higher and liberal arts students scoring lower than men-in-general.

## Ability Index Comparison of Curriculum Groups

The hypothesis that there would be no differences in ability between the five curriculum groups is examined by an analysis of variance of group means for factor VIII (SCAT, verbal ability), factor IX (SCAT Q, mathematics ability), and factor X (Scat total scores). The SCAT consists of 60 verbal and 50 quantitative items for a total of 110 items. The verbal scale measures primarily vocabulary and reading comprehension. The quantitative scale measures primarily arithmetic reasoning and understanding of basic arithmetical processes.

Factor VIII - Verbal Ability. Factor VIII, which is the mean score for the groups on SCAT V and the analysis of variance is presented in Table 3.15.

Students enrolling in Trade and Industrial programs achieved the lowest mean score on SCAT V, and General Education Science students the highest mean score. Trade and Industrial students scored significantly lower than Collegiate Technical Division, General Education Non-Science and General Education Science students. Trade and Industrial students seem to have less vocabulary and reading skills than the students in the three curriculum groups just mentioned. This is certainly an expected finding in view of the lesser verbal requirement in the Trade and Industrial program.

TABLE 3.15. SUMMARY OF ABILITY INDEX CONSTITUTING THE REDEFINED FACTOR VIII - VERBAL ABILITY

| Scale | Factor Loading | Total Group Mean |
|---|---|---|
| 1. SCAT Verbal | -.436 | 27.79 |

Analysis of Variance for Factor VIII

| Source of Variance | Sum of Squares | Degs. of Freedom | Mean Squares | F Statistics | Approx. Probability |
|---|---|---|---|---|---|
| Between | 3013.89 | 4 | 753.47 | 11.80 | 0.00 |
| Within | 59687.24 | 935 | 63.84 | | |
| Total | 62701.13 | 939 | | | |

Duncan Multiple Range Test

| Curriculum Group: | Trade & Industrial | Terminal Business | Collegiate Tech. | Gen. Educ. Non-Science | Gen. Educ. Science |
|---|---|---|---|---|---|
| Mean:* | 25.42 | 27.34 | 28.96 | 29.16 | 30.05 |

*Means with common underlining do not differ significantly at the .01 probability level. Means not commonly underlined differ significantly at the .01 probability level.

While no definite comparison is attempted in this study, it seems worthy of mention that the verbal abilities of those Trade and Industrial students are above the average for nationwide samples of graduating high school seniors.[11]

Factor IX - Quantitative Ability. Mathematical ability is represented in factor IX. The SCAT Q factor loading and mean score for each group and the results of analysis of variance are presented in Table 3.16.

General Education Science students mean score is significantly higher than scores for the other four curriculum groups. As with the verbal section of this test, it appears as if students emphasizing science programs also have a higher reasoning ability and understanding of arithmetic skills.

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[11] School and College Ability Tests, Manual for Interpreting Scores, Educational Testing Service, Princeton, N.J., Los Angeles 27, Calif.

TABLE 3.16. SUMMARY OF ABILITY INDEX CONSTITUTING THE REDEFINED FACTOR IX - QUANTITATIVE ABILITY

| Scale | Factor Loading | Total Group Mean |
|---|---|---|
| 1. SCAT Quantitative | -.594 | 33.06 |

Analysis of Variance for Factor IX

| Source of Variance | Sum of Squares | Degs. of Freedom | Mean Squares | F Statistics | Approx. Probability |
|---|---|---|---|---|---|
| Between | 4926.05 | 4 | 1231.51 | 17.23 | 0.00 |
| Within | 66846.73 | 935 | 71.49 | | |
| Total | 71772.78 | 939 | | | |

Duncan Multiple Range Test

| Curriculum Group: | Trade & Industrial | Terminal Business | Gen. Educ. Non-Science | Collegiate Tech. | Gen. Educ. Science |
|---|---|---|---|---|---|
| Mean:* | 31.29 | 32.39 | 32.51 | 34.05 | 38.47 |

*Means with common underlining do not differ signficantly at the .01 probability level. Means not commonly underlined differ signficantly at the .01 probability level.

Factor X - General Scholastic Ability. The total SCAT score is represented by factor X. The factor loadings, mean, and results of analysis of variance are presented in Table 3.17.

Consistent with the findings of the other two ability measure factors, General Education Science students have the highest mean scores and Trade and Industrial students the lowest. Trade and Industrial students have significantly lower means than Collegiate Technical Division and General Education Science students. General Education Science student means are significantly higher than student means for any of the other four curriculum groups.

## TABLE 3.17. SUMMARY OF ABILITY INDEX CONSTITUTING THE REDEFINED FACTOR X - GENERAL SCHOLASTIC ABILITY

| Scale | Factor Loading | Total Group Mean |
|---|---|---|
| 1. SCAT Total | -.594 | 60.83 |

Analysis of Variance for Factor X

| Source of Variance | Sum of Squares | Degs. of Freedom | Mean Squares | F Statistics | Approx. Probability |
|---|---|---|---|---|---|
| Between | 13554.49 | 4 | 3388.62 | 18.66 | 0.00 |
| Within | 169836.15 | 935 | 181.64 | | |
| Total | 183390.63 | 939 | | | |

Duncan Multiple Range Test

| Curriculum Group: | Trade & Industrial | Terminal Business | Gen. Educ. Non-Science | Collegiate Tech. | Gen. Educ. Science |
|---|---|---|---|---|---|
| Mean:* | 56.68 | 59.72 | 61.64 | 63.13 | 68.51 |

*Means with common underlining do not differ significantly at the .01 probability level. Means not commonly underlined differ significantly at the .01 probability level.

The null hypothesis that there would be no difference in measured ability between the five curricula groups is rejected. It would appear safe to say that the more science oriented the program the higher the academic ability of students entering two year or less college programs. Also, students entering the more practical, applied programs consistently have less general academic ability. The General Education Science students have significantly higher measured quantitative scores than any of the other four curriculum groups.

Factor XI - Academic Grade Point Average. The final hypothesis relating to the first phase of this study, comparing and contrasting students interest, ability, and academic background is that there is no difference in high school academic grade point averages between the five curriculum groups. The factor loadings, mean, and results of analysis of variance data for factor XI (high school academic grade point average) is presented in Table 3.18.

## TABLE 3.18. SUMMARY OF ABILITY INDEX CONSTITUTING THE REDEFINED FACTOR XI - ACADEMIC GRADE POINT AVERAGE

| Scale | Factor Loading | Total Group Mean |
|---|---|---|
| 1. HS Academic Grade Point Average | -.318 | 1.90 |

### Analysis of Variance for Factor XI

| Source of Variance | Sum of Squares | Degs. of Freedom | Mean Squares | F Statistics | Approx. Probability |
|---|---|---|---|---|---|
| Between | 16.67 | 4 | 4.17 | 12.83 | 0.00 |
| Within | 303.76 | 935 | 0.32 | | |
| Total | 320.43 | 939 | | | |

### Duncan Multiple Range Test

| Curriculum Group: | Terminal Business | Trade & Industrial | Gen. Educ. Non-Science | Collegiate Tech. | Gen. Educ. Science |
|---|---|---|---|---|---|
| Mean:* | 1.75 | 1.77 | 1.97 | 2.03 | 2.12 |

*Means with common underlining do not differ significantly at the .01 probability level. Means not commonly underlined differ significantly at the .01 probability level.

General Education Science and Collegiate Technical Division students have significantly higher high school academic averages than Terminal Business and Trade and Industrial students.

It appears as if students entering the more science oriented programs have more successful academic backgrounds than students entering the more applied-technical programs. Students entering programs of two years or less of college work at Ferris State College seem to generally have poor high school records. This in part is explained by the tendency of students to use these programs as an opportunity to raise grades in hopes of then enrolling in baccalaureate level programs in areas of interest. However, it appears that they do differ significantly enough from one curriculum group to another to reject the null hypothesis that no differences in high school academic performance would be found.

## Summary

In summary, the results of this phase of the study suggests that students entering one type of technical or associate degree program can be differentiated from students entering other programs at the same level on interest and ability variables. The mean scores from low to high for the five student groups on the eleven factors is presented in Table 3.19.

TABLE 3.19. SUMMARY OF FACTOR DIFFERENCES FOR STUDENTS IN FIVE DISCREPANT TECHNICAL AND JUNIOR COLLEGE PROGRAMS

| Factor | LOW MEAN | | TO | HIGH MEAN | |
|---|---|---|---|---|---|
| I. Social Service | *T&I(338) | *CTD(345) | *GES(368) | *TB(403) | *GENS(420) |
| IIA. Biological-Physical Science | TB(230) | GENS(328) | T&I(360) | CTD(365) | GES(390) |
| IIB. Business Mgt. | GES(254) | T&I(264) | CTD(267) | GENS(271) | TB(329) |
| IIIA. Technical | TB(363) | GENS(395) | CTD(421) | GES(466) | T&I(483) |
| IIIB. Verbal-Linguistic | T&I(105) | GES(109) | CTD(119) | TB(126) | GENS(127) |
| IV. Computational | T&I(41) | GENS(45) | CTD(45) | GES(47) | TB(53) |
| V. Specialization Level | TB(29) | T&I(30) | GES(31) | CTD(31) | GENS(32) |
| VI. Occupational Level | T&I(44) | GES(47) | CTD(47) | GENS(49) | TB(51) |
| VII. Masculinity-Femininity | GENS(47) | CTD(47) | TB(48) | GES(51) | T&I(54) |
| VIII. Verbal Ability | T&I(25) | TB(27) | CTD(28) | GENS(29) | GES(30) |
| IX. Quantitative Ability | T&I(31) | TB(32) | GENS(32) | CTD(34) | GES(38) |
| X. Total Ability | T&I(56) | TB(59) | GENS(61) | CTD(63) | GES(68) |
| XI. H.S. Academic Average | TB(1.75) | T&I(L.77) | GENS(1.97) | CTD(2.03) | GES(2.12) |

*T&I - Trade and Industrial, CTD - Collegiate Technical, GES - General Education Science, TB - Terminal Business, GENS - General Education Non-Science.

The Terminal Business students had the lowest mean scores on the biological-physical science, technical, and specialization level interest factors as well as on the high school grade point factor. This group recorded the second lowest scores on the verbal, quantitative, and total ability factors. In the other direction, Terminal Business students scored highest on business-management, computational, and occupational level interest factors. These students also had the second highest score on social service and verbal-linguistic interest factors. The pattern exhibited by the Terminal Business student seems to be one of low ability and academic performance and rejection of science and technical areas along with high business and verbal interests and high occupational aspirations.

The General Education Science students had the lowest score on the business-management interest factor and the highest score on the biological-physical science interest factor, the verbal, quantitative, total ability, and high school grade point ability factors. The General Education Science student had the second lowest score on the verbal-linguistic and occupational level interest factors and the second highest score on the technical, computational, and masculinity-femininity interest factors. The interpretation of this pattern of General Education Science students as having high ability, high academic performance, and having an interest in either biological or physical science research activities would appear most accurate. In the other direction they appear to reject business management functions. On a secondary level they seem to accept technical and computational occupations but reject occupations requiring verbal skills.

The General Education Non-Science group had the lowest mean score on the masculinity-femininity interest related factor and the highest score on the social service, verbal linguistic, and specialization level interest factors. General Education Non-Science students also had the second lowest scores on the biological-physical science, technical, computational factors and the second highest score on the business management, and occupational level interest factors. They also had the second highest score on the verbal ability factor. The students in this area are most distinctive for their strong other-people, verbal interests and their disinterest in occupational areas which require an ttention to detail and a continued persistence in handling assigned tasks.

The Collegiate Technical students appear to be most distinctive for their lack of either a most high or low score in comparison to the other four groups. In the low direction they seem to express a disinterest in social service areas similar in nature to the disinterest expressed by Trade and Industrial students. In the high direction they express an interest in biological-physical science fields similar to General Education Science students. Also, they had the second highest scores on the quantitative, total ability, and high school grade point factors with only the General Education Science students scoring higher on the latter three factors. Basically, it appears as if the Collegiate Technical students have the most indefinite pattern on the factors under scrutiny in this study. Perhaps this can best be explained by pointing out the diversity of programs, ranging from commerical artist to industrial chemistry, offered within the Collegiate Technical Division.

The Trade and Industrial students had the lowest mean score on social service, verbal-linguistic, computational and occupational level interest factors and on the verbal, quantitative and total ability factors. These students also had the second lowest score on business management, specialization level interest factors, and on the high school grade point factor. The Trade and Industrial students had the highest mean score on only two factors. One observation which seems reasonable is that the Trade and Industrial students appear to have highly specific interests. In fact, their lack of interest or dislike for certain broad types of occupational areas seems to be a common characteristic. Also, distinctively different from associate degree program students.

# CHAPTER IV

# RESULTS II

## PROGRESS OF STUDENTS THROUGH TWO YEARS OF STUDY

Data for this section of the study is drawn from two sources; the number of students falling into each of the final outcome categories and the reasons given by students for withdrawing or changing curriculum during the course of the study.

As was mentioned previously, students placed in the various outcome categories represent relatively pure groups in that verification of withdrawal and transfer to other schools was possible. Students who withdrew from Ferris and transferred to another college, and were successful at this second college, were classified accordingly.

There is some discrepancy in the base rate data presented for final outcome versus change and withdrawal. The reason for this discrepancy is that the final outcome data covers experience at other colleges. Reasons for change of program and withdrawal data limits its coverage to actions taken at Ferris State College.

### Overall Educational Outcome of Students Studied

Table 4.1 presents the number of students classified in each of six possible outcome categories at the cessation of the study.

Of the 941 students included in the study, 419 or 44.5 percent had completed or were satisfactorily continuing in the program originally entered in at the cessation of the study. Another 90 students, an additional 9.5 percent had either completed or were satisfactorily continuing in a program other than originally enrolled in at the conclusion of the study. This gives a total of 509 or 44.5 percent of the total who completed or successfully continued over the course of the study.

Of students withdrawing from college, 80 or 8.5 percent withdrew with above a 2.00 grade point average. The largest number of students withdrawing, 352 or 37.4 percent of the total withdrew with less than a 2.00 g.p.a.

In summary, the substantial majority of the students included in this study (62.5 percent) had an academically successful experience in college although 8.5 percent of these students definitely did not complete a program. A minority of students (37.5 percent) left college with less than a 2.00 and apparently did not re-enroll at other colleges during the two year period covered. It seems safe to speculate that many of these unsuccessful students will be successful in later attempts at college.

TABLE 4.1. SUMMARY OF STUDENT OUTCOME AT THE CESSATION OF THE STUDY

| | N=95 | N=146 | N=130 | N=274 | N=296 | N=941 |
|---|---|---|---|---|---|---|
| | CTD | TB | GES | GENS | T&I | Total |
| Completion or continuance original program | 43 | 57 | 43 | 102 | 174 | 419 |
| Completion or continuance alternate program | 7 | 10 | 23 | 37 | 13 | 90 |
| SUBTOTAL | 50 | 67 | 66 | 139 | 187 | 509 |
| Withdrawal | | | | | | |
| Academically successful original program | 4 | 5 | 8 | 24 | 33 | 74 |
| Academically successful alternate program | 2 | 0 | 0 | 2 | 2 | 6 |
| SUBTOTAL | 6 | 5 | 8 | 26 | 35 | 80 |
| Withdrawal | | | | | | |
| Academically unsuccessful original program | 32 | 67 | 47 | 101 | 66 | 313 |
| Academically unsuccessful alternate program | 7 | 7 | 9 | 8 | 8 | 39 |
| SUBTOTAL | 39 | 74 | 56 | 109 | 74 | 352 |
| TOTAL | 95 | 146 | 130 | 274 | 296 | 941 |

The results of this study, in terms of the percentages of successful completion of programs and satisfactory grades preceding withdrawal, seems to present a highly encouraging picture of the progress of students through two year level post high school educational and vocational programs.

Table 4.2 presents the percentages of students in each of the major curriculum groupings who continued in an original or alternate program throughout the two years of the study.

TABLE 4.2. PERCENTAGES OF STUDENTS IN EACH CURRICULUM CLASSIFICATION CONTINUING OR COMPLETING THE ORIGINAL OR AN ALTERNATE PROGRAM

| | CTD | TB | GES | GENS | T&I | Total |
|---|---|---|---|---|---|---|
| Original | 45 | 39 | 33 | 37 | 59 | 44 |
| Alternate | 8 | 7 | 18 | 14 | 4 | 10 |
| TOTAL | 53 | 46 | 51 | 51 | 63 | 54 |

The most specific and applied curriculum (Trade and Industrial) retains students at the highest rate (59 percent). This general pattern of higher retention by the more technical programs is also seen in the relatively high (45 percent) retention rate in Collegiate Technical Division. Both General Education Science and General Education Non-Science show low retention rate (33 and 37 percent respectively) and higher change to alternative programs. This is as expected from the transfer oriented General Education students.

The findings in respect to the greater holding power of more definite and specific programs at the two year level is in line with general findings of studies reported of students enrolled in four year programs. Speciality areas such as natural science and engineering tend to be less susceptible to losses (French 1961 and Grande 1964).

### Reasons Given by Students for Changing Program at Ferris State College

The main interest in analyzing these results is the comparison of frequencies and types of reasons cited by students in the various curriculum groups during the first versus the second year.

Table 4.3 presents the numbers of students in each of the curriculum groups who listed a single or multiple reason for change.

TABLE 4.3. SUMMARY BY DIVISION OF SINGLE VERSUS MULTIPLE REASONS CITED FOR CHANGE OF PROGRAM

| Number of Reasons | N=95 CTD | N=146 TB | N=130 GES | N=274 GENS | N=296 T&I | N=941 Total |
|---|---|---|---|---|---|---|
| One | 8(8%) | 9(6%) | 11(8%) | 27(10%) | 17(6%) | 72 |
| Two | 7(7%) | 4(3%) | 5(4%) | 11(4%) | 2(1%) | 29 |
| Three | 0(0%) | 3(2%) | 2(2%) | 4(1%) | 0(0%) | 9 |
| TOTAL | 15(15%) | 16(11%) | 18(14%) | 42(15%) | 19(7%) | 110 |

In general, most students in this study tended to see their motivations for changing golas in a rather simplified manner, giving one single factor as the reason for their change. This tendency was especially true of students in a Trade and Industrial program.

Table 4.4 presents the number of students in each program who changed major during the first and second years of the study. As would be expected, the large majority of changes occurred during the first year of college and the definite terminal state of Collegiate Technical Division and Trade and Industrial programs was reflected in only one change during the second year in these two programs.

TABLE 4.4. SUMMARY OF WHEN CHANGE OCCURRED BY DIVISION

| | N=95 CTD | N=146 TB | N=130 GES | N=274 GENS | N=296 T&I | N=941 Total |
|---|---|---|---|---|---|---|
| First Year | 14(15%) | 11(8%) | 15(12%) | 33(12%) | 19(6%) | 92(10%) |
| Second Year | 1(1%) | 5(3%) | 3(2%) | 9(3%) | 0 | 18(2%) |
| TOTAL | 15(16%) | 16(11%) | 18(14%) | 42(15%) | 19(6%) | 110(12%) |

Examination of Table 4.4 suggests that students in the Trade and Industrial area were least likely to change and if such a change of educational goals occurred it occurred during the first year. This also seems to be basically true of students in the Collegiate Technical Division. A general observation would be that students in technical and associate degree programs are five times as likely to change educational goals during the first year as opposed to the second year.

Attempting to relate these findings to previous research studies is a difficult task. Examining the related research section of this report (pp. 3-11), one finds that generally the reported change rate for a student group was around 33 percent. Pierson (1962) indicated that 29 percent changed majors during their freshmen year. Gamble (1962) noted that 38 percent of his group changed majors during their first three semesters. The results of this study do not seem to be comparable. Perhaps one could conclude that students entering technical and associate degree programs are not as likely to change as students who have four-year educational goals.

Table 4.5 presents the specific reasons given by students for change, classified into: (1) vague, (2) developmental reasoning and, (3) circumstantial orientation. The general typing was an attempt to differentiate the reasons into those that seemed to be evasive, those that seemed to connotate generally positive interest development and those that seemed to be more indicative of change as a result of the external pressure of circumstances imposed upon the student. The specific criteria employed are given in a footnote form below.* The same classification system will be employed in the treatment of reasons for withdrawal.

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*Vague reasoning - Reason that gives no clear idea of actual reason for leaving the program and includes the following specific reasons: to work, enter service, no reason, personal, leaving, and taking a break.

Developmental - Reasons that imply growth or synthesization of new knowledge of self on the part of the student and includes the following specific reasons: transferred, disatisfied with program, lack of interest, not sure of vocational goal, change of interest, graduating, and course change.

Circumstantial - Reasons that imply external circumstances, including inability to handle material, dictated the withdrawal action and includes the following specific reasons: couldn't understand material, low grades, college adjustment problems, financial, family difficulty, disciplinary, marriage, health, and unable to get schedule.

Multiple reasons - If a circumstantial reason was included the basic reason was classified as circumstantial, if a developmental with no circumstantial reason was listed the basic reason was considered to be developmental. If reasons were vague or conflicting between circumstantial and developmental, basic reason was considered to be vague.

TABLE 4.5. SUMMARY OF CLASSIFICATION OF REASONS CITED BY STUDENTS FOR CHANGING PROGRAMS*

|  | N=95 | N=146 | N=130 | N=274 | N=296 | N=941 |
|---|---|---|---|---|---|---|
| Reasons | CTD | TB | GES | GENS | T&I | Total |
| Vague reasoning (no reason) | 0 | 0 | 2(11%) | 3(7%) |  | 5(49%) |
| Developmental (change of interest, change anticipated, program not as expected, change suggested, better job opportunities) | 12(80%) | 9(56%) | 9(50%) | 34(81%) | 18(95%) | 82(74%) |
| Circumstantial (committee action, low grades, financial) | 3(20%) | 7(44%) | 7(39%) | 5(12%) | 1(5%) | 23(21%) |
| TOTAL | 15 | 16 | 18 | 42 | 19 | 110 |

Reasons for change are classified into vague reasoning, developmentally oriented and circumstantially oriented categories, in an attempt to make them more psychologically meaningful. Classification into these categories was accomplished largely on a judgemental basis. It did not seem possible in all cases to clearly specify the student's real motivation in changing.

If this dicotomy is accepted, then it would appear that a substantial majority of the students (82/110) changed program for what might be considered developmental reasons. When viewed on a divisional basis it seems that students in the Collegiate Technical Division, General Education Science, and Trade and Industrial Division have a need to produce "good" oriented reasons for change. On the other hand, Terminal Business and General Education Non-Science students seem to be more likely to be influenced by external pressures or circumstances.

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*A copy of the change questionnaire students responded to when making a major change is reported in Appendix A.

## Reasons Given by Students for Withdrawing From Ferris State College

In this section the concern is with the number of students who withdrew from college during the course of the study and the reasons cited for this action. In Table 4.8 a specific tabulation of the reasons given by students for withdrawing from Ferris State College prior to the cessation of the study is presented. In Table 4.6 the number of reasons cited by students for withdrawal are given.

TABLE 4.6. NUMBER OF REASONS GIVEN FOR WITHDRAWING

| Number of Reasons | N=95 CTD | N=146 TB | N=130 GES | N=274 GENS | N=296 T&I | N=941 Total |
|---|---|---|---|---|---|---|
| One | 42(88%) | 90(83%) | 66(73%) | 157(85%) | 110(85%) | 465(83%) |
| Two | 5(10%) | 13(12%) | 15(17%) | 23(12%) | 17(13%) | 73(14%) |
| Three | 1(2%) | 6(5%) | 9(10%) | 5(3%) | 2(2%) | 23(3%) |
| TOTAL | 48 | 109 | 90 | 185 | 129 | 561(61%) |

As in the case of students who changed programs, students who withdrew tended to present a fairly uncomplex single reason for withdrawing from Ferris State College. General Education Science students show some tendency to present a more complex reasoning for withdrawing than did students in the other curriculum majors.

Table 4.7 presents the number of students who withdrew during the first and second years of the study.

TABLE 4.7. NUMBER OF STUDENTS IN EACH CURRICULUM GROUPING WHO WITHDREW DURING THE FIRST AND SECOND YEARS OF THE STUDY

| Year | N=95 CTD | N=146 TB | N=130 GES | N=274 GENS | N=296 T&I | N=941 Total |
|---|---|---|---|---|---|---|
| First | 40(42%) | 86(59%) | 71(55%) | 155(57%) | 100(34%) | 452(48%) |
| Second | 8(8%) | 23(16%) | 19(15%) | 30(11%) | 29(10%) | 109(12%) |
| Total | 48(50%) | 109(75%) | 90(70%) | 185(68%) | 129(44%) | 561(60%) |

As would be anticipated, the vast majority of withdrawals (81%) occurred during the first year of the study. The incidences of withdrawal during the first versus second year does not vary to any appreciable degree for students in the different curriculum groups.

Table 4.8 presents the number of reasons under three major classifications: (1) vague reasoning, (2) developmental orientation, and (3) circumstantial, given by students in each major curriculum grouping for withdrawing from Ferris during the course of the study. A description of the criterion employed in making the above classification is given in footnote form on page 55.

TABLE 4.8. NUMBER OF STUDENTS GIVING VARIOUS TYPES OF REASONS FOR WITHDRAWING FROM FERRIS STATE COLLEGE DURING THE COURSE OF THE STUDY

| Reasons | N=95<br>CTD | N=146<br>TB | N-130<br>GES | N=274<br>GENS | N=296<br>T&I | N=941<br>Total |
|---|---|---|---|---|---|---|
| Vague reasoning (take a break, enter service, no reason, work, personal) | 13(27%) | 31(28%) | 17(19%) | 35(19%) | 47(36%) | 143(26%) |
| Developmental orientation (transfer, lack of interest, graduation, change of interest, course change, dissatisfied with program) | 18(38%) | 15(14%) | 24(27%) | 55(30%) | 24(19%) | 136(24%) |
| Circumstantial orientation (financial, disciplinary dismissal, health, low grades, family difficulty, adjustment problems, marriage, couldn't get courses, couldn't understand material) | 17(35%) | 63(58%) | 49(54%) | 95(51%) | 58(45%) | 282(50%) |
| TOTAL | 48 | 109 | 90 | 185 | 129 | 561 |

Of the 561 students who presented reasons for withdrawing, 282 or exactly one-half attributed the withdrawal as a necessity due to circumstances such as financial problems, health problems, low grades, etc. A separate tabulation, which is of interest, showed that low grades were the reason, or a part of the reason, presented by only 28 percent of the students (158 instances). Developmentally oriented reasons were in a minority, as only 24 percent cited one of these reasons for withdrawing. This is not surprising in light of the action taken.

Inter-curriculum grouping differences are not extremely pronounced. Collegiate Technical students tended to present fewer circumstantial reasons and more developmental reasons. Possibly this is a reflection of a general collegiate level terminal to college level baccalaureate movement. Terminal Business and General Education Science and Non-Science students presented more circumstantial reasons. This could be a reflection of GPA problem which would be expected to plague students in these curriculum classifications.

## Summary

In summary, retention figures during the course of this study present an encouraging picture. Forty-four percent of the students studied completed or were successfully continuing the program originally enrolled in at the cessation of the study. An additional 10 percent changed to an alternate program and completed or were continuing in this second program at the cessation of the study. A total of 54 percent of the students included in this study can be classified as having definitely made a successful adjustment to post high school education and training.

Of the remaining 46 percent of students who withdrew, 10 percent had satisfactory grades at the time of withdrawal and could be viewed as having had satisfactory, although abbreviated, post high school experience. It can be stated that 64 percent of our students had a successful academic experience in post high school education.

The incidence of change and withdrawal by college students has been a subject of continued inquiry by interested college student personnel staff. In Table 4.9 is a summary of the incidence of change and withdrawal reported by the technical and associate degree students involved in this project.

Upon examination of this table one is immediately aware of the following rates of change and withdrawal: (1) A greater proportion of students seem to change and withdraw the first year as opposed to the second. (2) The withdrawal figures seem high particularly in the Terminal Business (75 percent), General Education Science (70 percent), and Non-Science divisions (68 percent). (3) The change of program rates (12 percent) seem very low. However, the total withdrawal rate (60 percent) is not much different than the figures reported in other studies at the junior college level. Comparing the change (110) and withdrawal (561) numbers it would appear that students were much more willing to give up educational goals rather than alter or change to a secondary goal. On the one hand these figures would appear to be partly due to the function of the technical and associate degree programs. The type of program offered at this level are necessarily short and specialized and students generally have very specific original educational goals in mind. Also, the two year college program offers an opportunity to many marginal college students to experience post high school education. If the students who transferred are taken into account and treated not as a college dropout but as a student who potentially may continue in a similar or alternate program at another institution of higher education the figures just discussed are not so alarming.

TABLE 4.9. SUMMARY OF CHANGE AND WITHDRAWAL*

| N=95 | | N=146 | | N=130 | | N=274 | | N=296 | | N=941 | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| CTD | | TB | | GES | | GENS | | T&I | | Total | |
| Change- | With. | Change- | With. | Change- | With. | Change- | With. | Change- | With. | Change- | With. |
| First Year | | | | | | | | | | | |
| 14<br>(15%) | 40<br>(42%) | 11<br>(8%) | 68<br>(59%) | 15<br>(12%) | 71<br>(55%) | 33<br>(12%) | 155<br>(57%) | 19<br>(6%) | 100<br>(34%) | 92<br>(10%) | 452<br>(48%) |
| Second Year | | | | | | | | | | | |
| 1<br>(1%) | 8<br>(8%) | 5<br>(3%) | 23<br>(16%) | 3<br>(2%) | 19<br>(15%) | 9<br>(3%) | 30<br>(11%) | 0<br>(0%) | 29<br>(10%) | 18<br>(2%) | 109<br>(12%) |
| Total | | | | | | | | | | | |
| 15<br>(16%) | 48<br>(50%) | 16<br>(11%) | 109<br>(75%) | 18<br>(14%) | 90<br>(70%) | 42<br>(15%) | 185<br>(68%) | 19<br>(6%) | 109<br>(44%) | 110<br>(12%) | 561<br>(60%) |

*Includes transfers who at the cessation of the study were classified as continuing in a similar program, alternate program, or withdrawal from another college.

During the course of this study some 184 students transferred.* Follow-up letters and telephone calls to some 59 institutions of higher education indicated that 80 students were actually enrolled in similar or alternate programs at the conclusion of the study. It would appear that withdrawal figures when viewed in one perspective can be seen as substantiating the observation that a higher percentage of associate degree and technical students are unsuccessful (60 percent) but viewed in another way, taking into account transfer function and grades earned while in college, it appears as if some 62 percent were either continuing in college or were academically successful during their college experience.

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*Of 561 students who withdrew transcripts were sent to other colleges for 184 students who where followed to determine their eventual disposition.

The summary table, Table 4.10, of reasons cited for change and withdrawal implies that reasons cited for withdrawal would appear to be primarily of a circumstantial nature.

TABLE 4.10. SUMMARY OF REASONS CITED FOR CHANGE AND WITHDRAWAL

| N=95 | | N=146 | | N=130 | | N=274 | | N=296 | | N=941 | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| CTD | | TB | | GES | | GENS | | T&I | | Total | |
| Change- | With | Change- | With | Change- | With | Change- | With | Change- | With | Change- | With |
| Vague | | | | | | | | | | | |
| 0<br>( 0) | 13<br>(27%) | 0<br>(0) | 31<br>(28%) | 2<br>(11%) | 17<br>(19%) | 3<br>(7%) | 35<br>(19%) | 0<br>(0) | 47<br>(36%) | 5<br>(4%) | 143<br>(26%) |
| Developmental | | | | | | | | | | | |
| 12<br>(80%) | 18<br>(38%) | 9<br>(56%) | 15<br>(14%) | 9<br>(50%) | 24<br>(27%) | 34<br>(81%) | 55<br>(30%) | 18<br>(95%) | 24<br>(19%) | 82<br>(74%) | 136<br>(24%) |
| Circumstantial | | | | | | | | | | | |
| 3<br>(20%) | 17<br>(35%) | 7<br>(44%) | 63<br>(58%) | 7<br>(39%) | 49<br>(54%) | 5<br>(12%) | 95<br>(51%) | 1<br>(5%) | 58<br>(45%) | 23<br>(21%) | 282<br>(50%) |
| 15 | 48 | 16 | 109 | 18 | 90 | 42 | 185 | 19 | 129 | 110 | 561 |

The student may be seen as saying that his reasons for leaving were external to himself or a situation over which he has little or no control. Students who change to alternate programs from that originally enrolled in seem to have primarily developmental reasons for this move. The implication seems to be that students who change do so because their educational goals have clarified and may be seen as internally consistent. Students who withdraw seem to have unclear educational goals and seem more influenced by external forces.

## CHAPTER V

## RESULTS - III

### INTEREST, ABILITY AND ACHIEVEMENT FACTORS RELATED TO SUCCESS, COMPLETION, CHANGE TO AN ALTERNATE PROGRAM OR WITHDRAWAL FROM COLLEGE

The second phase of this study is designed to examine the differences in high school grade point average, ability test scores, and interest profiles of students who continue or complete a program from those who change to an alternate program or withdrew from college. Because the results of Phase I strongly indicated that each curriculum group differed from the other in ability, previous high school academic record, and in interest a separate factor analysis and analysis of variance was done for each curriculum group. The hypotheses which were tested within this phase of the study were:

4. There will be no differences in ability level between male students who successfully complete their original program, those male students who make a major change, or male students who discontinue. (This will be tested for each of the five curriculum groups involved in the study).
5. There will be no differences in measured interest patterns between male students who successfully complete their original program, those male students who make a major change, or male students who discontinue. (This will be tested for each of the five curriculum groups involved in the study).
6. There will be no differences in high school grades between those male students who successfully complete their original program, those male students who make a major change, or male students who discontinue. (This will be tested for each of the five curriculum groups involved in the study).

One more comment needs to be made before the results of this phase of the study are examined. As in Phase I, the identified generalized factors for each group were redefined for analysis of variance (see pp. 29-30) so that each hypothesis could be tested separately. Five factors were identified for the Collegiate and Technical and Trade and Industrial groups which satisfied the criterion cited on page 22. After the interest related scales, the academic variables and the bipolarity of certain generalized factors were redefined, an analysis of variance technique was employed for 15 and 16 variables respectively. Four factors were identified for the Terminal Business, General Education Science, and General Education Non-Science groups. The analysis of variance technique was employed for 15, and 14 and 14 variables respectively.

This chapter is divided into five sections, one for each curriculum group. The first part of each section summarizes and labels each of the generalized factors identified for that particular group. The second part of each section summarizes the redefined factors which were found to not significantly differentiate between the students who continued, changed programs, or withdrew from college. The third part of each section examines the redefined factors which significantly differentiated between the students who completed, changed, or withdrew from college.

## Section I - Terminal Business

Three of the four identified factors for Terminal Business students were bipolar in nature. Factor I accounted for a majority of the variance. All of the social service scales, and many of the business detail scales loaded in the positive direction. The scales reflecting orientation towards dealing with ideas and abstract detail loaded at the negative end (science-abstract). Another way to look at the bipolarity of factor I is to view the occupations at one end as emphasizing people contact and occupation at the other end as emphasizing problem solving on a technical abstract level. Factor II occupations seem to be characterized by a verbal expressive communication of ideas orientation. Two scales loaded in the negative direction and seem to be related to business detail occupations. Factor III has all of the technical-physically active occupations loading in the one direction and the verbal business contact occupations loading in the other direction. Factor IV had the intellectual variables and one computational interest scale loading in one direction and science related occupations loading in the other direction (business-science). One explanation is that students who enter business related fields would view intellectual effort as not related to science variables. Another way to view these occupational scales loading on Factor IV would be to see these business occupations as using science skills.

Non-significant factors. No significant differences were found in eleven of the fifteen analysis of variance comparisons for the redefined factors. They were: (1) factors IA (science-abstract), (2) IB, (social service), (3) IIA (verbal expressive, (4) IIB (business detail, (5) IIIA (business contact), (6) IVA (business science),

(7) IVB (computational); (8) V (specialization level); (9) VI (occupational level); (10) IX (quantitative); and (11) XI (high school average). These redefined factors which did not significantly differentiate between the completion, change, and withdrawal groups and the analysis of variance are represented in Tables 5.1 - 5.11.

TABLE 5.1. SUMMARY OF INTEREST SCALES AND ANALYSIS OF VARIANCE FOR TERMINAL BUSINESS REDEFINED FACTOR IA - SCIENCE ABSTRACT

| Factor IA | Factor Loading | Mean |
|---|---|---|
| 1. Artist | .695 | 20.6 |
| 2. Architect | .676 | 18.3 |
| 3. Mathematician | .631 | 13.7 |
| 4. Physicist | .624 | 3.4 |
| 5. Army Officer | .611 | 21.2 |
| 6. Dentist | .573 | 20.3 |
| 7. Physician | .401 | 16.8 |

Analysis of Variance

| Source of Variance | Sum of Squares | Degs. of Freedom | Mean Square | F Statistics | Approx. Probability |
|---|---|---|---|---|---|
| Between | 9026.67 | 2 | 4513.33 | 1.46 | 0.24 |
| Within | 439257.98 | 142 | 3093.37 | | |
| Total | 448284.65 | 144 | | | |

| | | | |
|---|---|---|---|
| N | 57 | 17 | 72 |
| Group | Completion | Alternate | Withdrawal |
| Mean | 108.82 | 135.63 | 113.49 |

No significant differences found between any of the means.

TABLE 5.2. SUMMARY OF INTEREST SCALES AND ANALYSIS OF VARIANCE FOR TERMINAL BUSINESS REDEFINED FACTOR IB - SOCIAL SERVICE

| Factor IB | Factor Loading | Mean |
|---|---|---|
| 1. YMCA Secretary | -.931 | 22.4 |
| 2. Credit Manager | -.922 | 37.5 |
| 3. Bus. Educ. Teacher | -.909 | 35.5 |
| 4. Social Worker | -.889 | 21.7 |
| 5. Rehab. Counselor | -.886 | 28.5 |
| 6. Chamber of Commerce Exec. | -.880 | 34.3 |
| 7. Personnel Director | -.872 | 29.2 |
| 8. Social Science Teacher | -.839 | 33.2 |
| 9. YMCA Physical Director | -.807 | 24.4 |
| 10. School Superintendent | -.800 | 18.6 |
| 11. Public Administrator | -.747 | 28.9 |
| 12. Music Teacher | -.722 | 22.8 |
| 13. Physical Therapist | -.692 | 25.6 |
| 14. Office Worker | -.688 | 42.4 |
| 15. Optometrist | -.670 | 28.4 |
| 16. Minister | -.669 | 12.8 |
| 17. Accountant | -.525 | 31.8 |
| 18. Senior C.P.A. | -.493 | 33.7 |

Analysis of Variance

| Source of Variance | Sum of Squares | Degs. of Freedom | Mean Squares | F Statistics | Approx. Probability |
|---|---|---|---|---|---|
| Between | 31164.87 | 2 | 15582.43 | 0.70 | 0.50 |
| Within | 3140648.20 | 142 | 22117.24 | | |
| Total | 3171813.06 | 144 | | | |

| | | | |
|---|---|---|---|
| N | 57 | 17 | 72 |
| Group | Completion | Alternate | Withdrawal |
| Mean | 526.86 | 522.25 | 496.65 |

No significant differences found between any of the means.

TABLE 5.3. SUMMARY OF INTEREST SCALES AND ANALYSIS OF VARIANCE FOR TERMINAL BUSINESS REDEFINED FACTOR IIA - VERBAL-EXPRESSIVE

| Factor IIA | Loading | Mean | Factor IIA | Loading | Mean |
|---|---|---|---|---|---|
| 1. Musician Performer | .868 | 28.5 | 6. Librarian | .721 | 14.4 |
| 2. Biologist | .828 | 11.1 | 7. Author-Jour. | .596 | 27.3 |
| 3. Art Teacher | .824 | 13.8 | 8. Chemist | .534 | 17.0 |
| 4. Psychiatrist | .807 | 16.3 | 9. Osteopath | .474 | 24.2 |
| 5. Psychologist | .792 | 13.2 | | | |

Analysis of Variance

| Source of Variance | Sum of Squares | Degs. of Freedom | Mean Square | F Statistics | Approx. Probability |
|---|---|---|---|---|---|
| Between | 7415.18 | 2 | 3707.59 | 1.04 | 0.36 |
| Within | 504299.88 | 142 | 3551.41 | | |
| Total | 511715.06 | 144 | | | |

| | | | |
|---|---|---|---|
| N | 57 | 17 | 72 |
| Group | Completion | Alternate | Withdrawal |
| Mean | 162.67 | 184.56 | 161.19 |

No significant differences found between any of the means.

TABLE 5.4. SUMMARY OF INTEREST SCALES AND ANALYSIS OF VARIANCE FOR TERMINAL BUSINESS REDEFINED FACTOR IIB - BUSINESS DETAIL

| Factor IIB | Factor Loading | Mean |
|---|---|---|
| 1. Purchasing Agent | -.763 | 44.2 |
| 2. Banker | -.698 | 40.2 |

Analysis of Variance

| Source of Variance | Sum of Squares | Degs. of Freedom | Mean Square | F Statistics | Approx. Probability |
|---|---|---|---|---|---|
| Between | 949.93 | 2 | 474.96 | 1.90 | 0.15 |
| Within | 35525.93 | 142 | 250.18 | | |
| Total | 36475.86 | 144 | | | |

| | | | |
|---|---|---|---|
| N | 57 | 17 | 72 |
| Group | Completion | Alternate | Withdrawal |
| Mean | 85.72 | 77.31 | 85.24 |

No significant differences found between any of the means.

TABLE 5.5. SUMMARY OF INTEREST SCALES AND ANALYSIS OF VARIANCE FOR TERMINAL BUSINESS REDEFINED FATOR IIIA - BUSINESS CONTACT

| Factor IIIA | Factor Loading | Mean |
|---|---|---|
| 1. Advertising Man | .779 | 32.6 |
| 2. Life Insurance Salesman | .698 | 38.1 |
| 3. Lawyer | .671 | 29.0 |
| 4. Real Estate Salesman | .665 | 47.5 |
| 5. Sales Manager | .608 | 40.3 |
| 6. Pres. Manufacturing Concern | .544 | 34.2 |

Analysis of Variance

| Source of Variance | Sum of Squares | Degs. of Freedom | Mean Square | F Statistics | Approx. Probability |
|---|---|---|---|---|---|
| Between | 8177.21 | 2 | 4088.61 | 2.06 | 0.13 |
| Within | 281825.44 | 142 | 1984.69 | | |
| Total | 290002.65 | 144 | | | |

| | | | |
|---|---|---|---|
| N | 57 | 17 | 72 |
| Group | Completion | Alternate | Withdrawal |
| Mean | 224.23 | 200.38 | 224.43 |

No significant differences found between any of the means.

TABLE 5.6. SUMMARY OF INTEREST SCALES AND ANALYSIS OF VARIANCE FOR TERMINAL BUSINESS REDEFINED FACTOR IVA - BUSINESS-SCIENCE

| Factor IVA | Factor Loading | Mean |
|---|---|---|
| 1. Moritician | .532 | 42.3 |
| 2. Pharmacist | .497 | 38.2 |
| 3. Veterinarian | .495 | 28.0 |

Analysis of Variance

| Source of Variance | Sum of Squares | Degs. of Freedom | Mean Square | F Statistics | Approx. Probability |
|---|---|---|---|---|---|
| Between | 1916.16 | 2 | 958.08 | 2.66 | 0.07 |
| Within | 51229.19 | 142 | 360.77 | | |
| Total | 53145.35 | 144 | | | |

| | | | |
|---|---|---|---|
| N | 57 | 17 | 72 |
| Group | Completion | Alternate | Withdrawal |
| Mean | 104.70 | 107.56 | 112.40 |

No significant differences found between any of the means.

## TABLE 5.7. SUMMARY OF INTEREST SCALE AND ANALYSIS OF VARIANCE FOR TERMINAL BUSINESS REDEFINED FACTOR IV B - COMPUTATIONAL

| Factor IVB | Factor Loading | Mean |
|---|---|---|
| 1. C.P.A. Owner | -.541 | 21.9 |

### Analysis of Variance

| Source of Variance | Sum of Squares | Degs. of Freedom | Mean Square | F Statistics | Approx. Probability |
|---|---|---|---|---|---|
| Between | 186.26 | 2 | 93.13 | 1.21 | 0.30 |
| Within | 10897.70 | 142 | 76.74 | | |
| Total | 11083.96 | 144 | | | |

| | | | |
|---|---|---|---|
| N | 57 | 17 | 72 |
| Group | Completion | Alternate | Withdrawal |
| Mean | 21.95 | 24.88 | 21.11 |

No significant differences found between any of the means.

## TABLE 5.8. SUMMARY OF INTEREST RELATED SCALE AND ANALYSIS OF VARIANCE FOR TERMINAL BUSINESS REDEFINED FACTOR V - SPECIALIZATION LEVEL

| Factor V | Factor Loading | Mean |
|---|---|---|
| 1. Specialization Level | -.537 | 30.1 |

### Analysis of Variance

| Source of Variance | Sum of Squares | Degs. of Freedom | Mean Square | F Statistics | Approx. Probability |
|---|---|---|---|---|---|
| Between | 147.54 | 2 | 73.77 | 1.28 | 0.28 |
| Within | 8174.22 | 142 | 57.56 | | |
| Total | 8321.75 | 144 | | | |

| | | | |
|---|---|---|---|
| N | 57 | 17 | 72 |
| Group | Completion | Alternate | Withdrawal |
| Mean | 31.00 | 30.81 | 28.94 |

No significant differences found between any of the means.

TABLE 5.9. SUMMARY OF INTEREST RELATED SCALE AND ANALYSIS OF VARIANCE FOR TERMINAL BUSINESS REDEFINED FACTOR VI - OCCUPATIONAL LEVEL

| Factor VI | Factor Loading | Mean |
|---|---|---|
| 1. Occupational Level | .732 | 51.2 |

Analysis of Variance

| Source of Variance | Sum of Squares | Degs. of Freedom | Mean Square | F Statistics | Approx. Probability |
|---|---|---|---|---|---|
| Between | 42.63 | 2 | 21.32 | 0.41 | 0.66 |
| Within | 7351.96 | 142 | 51.77 | | |
| Total | 7394.59 | 144 | | | |

| | | | |
|---|---|---|---|
| N | 57 | 17 | 72 |
| Group | Completion | Alternate | Withdrawal |
| Mean | 51.77 | 50.06 | 50.99 |

No significant differences found between any of the means.

TABLE 5.10. SUMMARY OF QUANTITATIVE SCALE AND ANALYSIS OF VARIANCE FOR TERMINAL BUSINESS REDEFINED FACTOR IX - QUANTITATIVE

| Factor IX | Factor Loading | Mean |
|---|---|---|
| 1. SCAT Q | -.508 | 32.3 |

Analysis of Variance

| Source of Variance | Sum of Squares | Degs. of Freedom | Mean Square | F Statistics | Approx. Probability |
|---|---|---|---|---|---|
| Between | 217.11 | 2 | 108.56 | 1.82 | 0.17 |
| Within | 8449.26 | 142 | 59.50 | | |
| Total | 8666.37 | 144 | | | |

| | | | |
|---|---|---|---|
| N | 57 | 17 | 72 |
| Group | Completion | Alternate | Withdrawal |
| Mean | 33.72 | 33.13 | 31.17 |

No significant differences found between any of the means.

TABLE 5.11. SUMMARY OF HS GPA AND ANALYSIS OF VARIANCE FOR TERMINAL BUSINESS REDEFINED FACTOR XI - ACHIEVEMENT

| Factor XI | Factor Loading | Mean |
|---|---|---|
| 1. HS GPA | -.227 | 1.81 |

Analysis of Variance

| Source of Variance | Sum of Squares | Degs. of Freedom | Mean Square | F Statistics | Approx. Probability |
|---|---|---|---|---|---|
| Between | 0.70 | 2 | 0.35 | 1.02 | 0.36 |
| Within | 48.46 | 142 | 0.34 | | |
| Total | 49.16 | 144 | | | |

| | | | |
|---|---|---|---|
| N | 57 | 17 | 72 |
| Group | Compeltion | Alternate | Withdrawal |
| Mean | 1.83 | 1.83 | 1.65 |

No significant differences found between any of the means.

It appears that students who enter Terminal Business programs, regardless of whether they complete the program, decide to change to an alternate program, or simply withdraw from college have similar occupational interests and high school academic background. For example, if one examines the mean scores on the occupational scales loading on the factors under discussion, it can be hypothesized that students entering Terminal Business programs: (1) tend to reject science-abstract (F IA) occupations, (2) have fairly neutral reactions to most social service occupations (F IB), (3) tended to reject the verbal expressive occupations (F IA), (4) have strongly positive feelings toward business detail occupations (F IIB), (5) tend to have highly positive feelings toward occupations reflecting business contact (F IIIA) interest. The science related business scales (F IVA) had positive scores, however, the single factor CPA owner (F IVB) had a low scale score. Entering Terminal Business students scored extremely low on the specialization level (F V) and occupational level (F VI) scales particularly when compared with the norm groups cited by Campbell 1966 (see p. 353). They seem less willing to concentrate their efforts in one specific direction and seem to have a low occupational aspiration level when compared with outside norm groups. Finally, all Terminal Business students, regardless of outcome, entered college with a very poor high school record (F XI) and low average numerical skills (F IX).

**Significant factors.** The analysis of variance procedures indicated that a significant difference did exist at the .05 level or better for four redefined factors. They were: factor IIIB (technical), factor VII (masculinity-femininity), factor VIII (SCAT V), and factor X (SCAT T).

The scales loading highest on factor IIIB and the analysis of variance are presented in Table 5.12.

TABLE 5.12. SUMMARY OF INTEREST SCALES AND ANALYSIS OF VARIANCE FOR TERMINAL BUSINESS REDEFINED FACTOR IIIB - TECHNICAL

| Factor IIIB | Factor Loading | Mean |
|---|---|---|
| 1. Industrial Arts Teacher | -.868 | 23.8 |
| 2. Carpenter | -.823 | 23.4 |
| 3. Farmer | -.816 | 34.9 |
| 4. Airplane Pilot | -.804 | 28.9 |
| 5. Forest Service Man | -.763 | 20.8 |
| 6. Math-Science Teacher | -.754 | 27.5 |
| 7. Policeman | -.656 | 33.0 |
| 8. Farmer | -.816 | 34.9 |
| 9. Printer | -.581 | 33.8 |
| 10. Production Manager | -.368 | 33.0 |

Analysis of Variance

| Source of Variance | Sum of Squares | Degs. of Freedom | Mean Square | F Statistics | Approx. Probability |
|---|---|---|---|---|---|
| Between | 43151.23 | 2 | 21575.62 | 3.99 | 0.02 |
| Within | 767920.60 | 142 | 5407.89 | | |
| Total | 811071.83 | 144 | | | |

Scheffe's Post Hoc Analysis

| | | | |
|---|---|---|---|
| N | 17 | 72 | 57 |
| Group | Alternate | Withdrawal | Completion |
| Mean* | 328.81 | 275.72 | 271.93 |

*Means with common underlining do not differ significantly at the 01 probability level. Means not commonly underlined differ significantly at the 01 probability level.

Examination of the Scheffe's post hoc analysis indicates that students who change to an alternate program have significantly higher average scores on the technically oriented occupational scales than students who either complete or withdraw from the program. Students who withdraw from the program do not differ significantly from those who complete a program in Terminal Business.

The masculinity-femininity scale, denoted as factor VII, mean and analysis of variance results is presented in Table 5.13.

TABLE 5.13. SUMMARY OF INTEREST RELATED SCALE AND ANALYSIS OF VARIANCE FOR TERMINAL BUSINESS REDEFINED FACTOR VII - MASCULINITY-FEMININITY

| Factor VII | Factor Loading | Mean |
|---|---|---|
| 1. Masculinity-Femininity | -.693 | 48.0 |

Analysis of Variance

| Source of Variance | Sum of Squares | Degs. of Freedom | Mean Square | F Statistics | Approx. Probability |
|---|---|---|---|---|---|
| Between | 376.88 | 2 | 188.44 | 2.99 | 0.05 |
| Within | 8956.43 | 142 | 63.07 | | |
| Total | 9333.31 | 144 | | | |

Scheffe's Post Hoc Analysis

| | | | |
|---|---|---|---|
| N | 17 | 57 | 72 |
| Group | Alternate | Completion | Withdrawal |
| Mean* | 52.31 | 48.26 | 46.97 |

*Means with common underlining do not differ significantly at the .01 probability level. Means not commonly underlined differ significantly at the .01 probability level.

Terminal Business students who withdrew from college tended to score significantly lower on the masculinity-femininity scale than students who changed to an alternate program. Students who completed or withdrew did not differ statistically on this factor. Men who score low on this scale are typically more interested in art, books, music, working inside, keeping their hands clean, and for being considerate of others.

In Tables 5.14 and 5.15 the SCAT verbal and total score means and analysis of variance procedures are presented respectively.

TABLE 5.14. SUMMARY OF VERBAL ABILITY SCALE AND ANALYSIS OF VARIANCE FOR TERMINAL BUSINESS REDEFINED FACTOR VIII - VERBAL

| Factor VIII | Factor Loading | Mean |
|---|---|---|
| 1. SCAT V | -.491 | 27.3 |

Analysis of Variance

| Source of Variance | Sum of Squares | Degs. of Freedom | Mean Square | F Statistics | Approx. Probability |
|---|---|---|---|---|---|
| Between | 583.47 | 2 | 291.73 | 5.15 | 0.01 |
| Within | 8050.97 | 142 | 56.70 | | |
| Total | 8634.44 | 144 | | | |

Scheffe's Post Hoc Analysis

| N | 57 | 17 | 72 |
|---|---|---|---|
| Group | Completion | Alternate | Withdrawal |
| Mean* | 29.77 | 26.94 | 25.50 |

*Means with common underlining do not differ significantly at the .01 probability level. Means not commonly underlined differ significantly at the .01 probability level.

The students who withdrew from college scored significantly lower on the verbal and total ability test than students who completed the program. Students who changed to an alternate program did not differ statistically from those who completed or withdrew from college on these factors.

This implication is consistent with previous research findings which suggest that students who withdraw from college have less verbal and/or total ability than students who remain in college.

TABLE 5.15. SUMMARY OF TOTAL ABILITY SCALE AND ANALYSIS OF VARIANCE FOR TERMINAL BUSINESS REDEFINED FACTOR X - TOTAL ABILITY

| Factor X | Factor Loading | Mean |
|---|---|---|
| 1. SCAT T | -.645 | 59.7 |

Analysis of Variance

| Source of Variance | Sum of Squares | Degs. of Freedom | Mean Square | F Statistics | Approx. Probability |
|---|---|---|---|---|---|
| Between | 1483.16 | 2 | 741.58 | 5.47 | 0.01 |
| Within | 19236.25 | 142 | 135.47 | | |
| Total | 20719.41 | | | | |

Scheffe's Post Hoc Analysis

| | | | |
|---|---|---|---|
| N | 57 | 17 | 72 |
| Group | Completion | Alternate | Withdrawal |
| Mean* | 63.49 | 60.00 | 56.67 |

*Means with common underlining do not differ significantly at the .01 probability level. Means not commonly underlined differ significantly at the .01 probability level.

The results of this part of Phase II would seem to indicate that entering Terminal Business students, regardless of specific outcomes, have similar interests. Students who tended to change to an alternate program had significantly higher scores on only the technical factor scales when compared to students who completed or withdrew from college. Students who withdrew from college had significantly lower masculinity-femininity scores and lower SCAT verbal and total scores than students who completed the program.

## Section 2 - General Education Science

Four factors satisfied the criterion required for interpretation. The first factor for General Education Science students reflects a strong social service orientation. All of the social service scales load highest on this factor. Other scales loading high on factor I also suggested a social service emphasis, but in a more abstract form. Factor II is bipolar in nature with all of the physical science and a majority of the biological science scales loading in one direction, and those scales which imply a liberal arts expression loading in the same direction. The business detail and contact scales loaded in the other direction. Factor III is also bipolar characterized by technical, physically active occupations loading in one direction and occupations emphasizing verbal linguistic skills and verbal manipulation loading in the other direction. Factor IV emphasized the intellective variables and computational scales.

Non-significant factors. The analysis of variance procedure produced F statistics that were not significant for six of fourteen redefined factors. The six redefined factors which did not meet the required .05 level of confidence were: factor I (social service); factor IIA (biological-physical science); factor IIB (business management); factor IIIA (technical); factor IVA (veterinarian); and factor V (specialization level). In Tables 5.16 - 5.21 the scales loading highest on the non-significant factors and the analysis of variance are presented.

In general, it seems that students who enter General Education Science programs, regardless of whether they complete, change to and alternate program, or withdraw from college seem to have: (1) neutral feelings toward occupations reflecting a social service interest (F I); (2) neutral feelings toward biological physical science fields (F IIA); (3) neutral reactions toward business management occupations (F IIB); (4) fairly positive reactions to technically oriented fields (F IIIA), and; (5) neutral to positive mean scores on the veterinarian scale (F IVA). The entering General Education Science students scored low on the specialization level scale (F V) in comparison to the norm group cited by Campbell in the SVIB Manual. In comparison to the outside norm group the General Education Science students seem to be less willing to commit himself to any specific goal.

TABLE 5.16. SUMMARY OF INTEREST SCALES AND ANALYSIS OF VARIANCE FOR GENERAL EDUCATION SCIENCE REDEFINED FACTOR I - SOCIAL SERVICE

| Factor I | Factor Loading | Mean |
|---|---|---|
| 1. Social Worker | .930 | 19.3 |
| 2. Chamber of Commerce Exec. | .903 | 28.8 |
| 3. Business Education Teacher | .891 | 27.3 |
| 4. YMCA Secretary | .890 | 16.0 |
| 5. Credit Manager | .879 | 30.7 |
| 6. Personnel Director | .876 | 23.2 |
| 7. Rehab. Counselor | .868 | 24.3 |
| 8. Social Science Teacher | .824 | 27.4 |
| 9. School Superintendent | .810 | 16.1 |
| 10. Music Teacher | .806 | 23.8 |
| 11. YMCA Phys. Director | .751 | 33.2 |
| 12. Optometrist | .752 | 34.4 |
| 13. Physical Therapist | .751 | 33.2 |
| 14. Public Administrator | .746 | 26.2 |
| 15. Minister | .744 | 13.2 |
| 16. Pharmacist | .262 | 36.5 |

Analysis of Variance

| Source of Variance | Sum of Squares | Degs. of Freedom | Mean Square | F Statistics | Approx. Probability |
|---|---|---|---|---|---|
| Between | 15852.85 | 2 | 7926.43 | 0.46 | 0.63 |
| Within | 2135850.11 | 125 | 17086.80 | | |
| Total | 2151702.97 | 127 | | | |

| | | | |
|---|---|---|---|
| N | 40 | 32 | 56 |
| Group | Completion | Alternate | Withdrawal |
| Mean | 418.18 | 410.38 | 393.05 |

No significant differences found between any of the means.

TABLE 5.17. SUMMARY OF INTEREST SCALES AND ANALYSIS OF VARIANCE FOR GENERAL EDUCATION SCIENCE REDEFINED FACTOR IIA - BIOLOGICAL PHYSICAL SCIENCE

| Factor IIA | Loading | Mean | Factor IIA | Loading | Mean |
|---|---|---|---|---|---|
| 1. Biologist | .912 | 26.5 | 9. Chemist | .697 | 34.0 |
| 2. Physician | .878 | 34.7 | 10. Architect | .697 | 32.4 |
| 3. Mus. Performer | .834 | 36.1 | 11. Artist | .676 | 28.5 |
| 4. Psychologist | .778 | 20.2 | 12. Librarian | .664 | 20.3 |
| 5. Psychiatrist | .766 | 24.0 | 13. Osteopath | .541 | 33.4 |
| 6. Art Teacher | .744 | 19.6 | 14. Engineer | .519 | 36.5 |
| 7. Mathematician | .715 | 24.6 | 15. Physicist | .439 | 16.6 |
| 8. Dentist | .710 | 34.3 | | | |

Analysis of Variance

| Source of Variance | Sum of Squares | Degs. of Freedom | Mean Square | F Statistics | Approx. Probability |
|---|---|---|---|---|---|
| Between | 28982.08 | 2 | 14491.04 | 1.02 | 0.37 |
| Within | 1781477.42 | 125 | 14251.82 | | |
| Total | 1810459.50 | 127 | | | |

| | | | |
|---|---|---|---|
| N | 40 | 32 | 56 |
| Group | Completion | Alternate | Withdrawal |
| Mean | 449.00 | 411.97 | 420.34 |

No significant differences found between any of the means.

TABLE 5.18. SUMMARY OF INTEREST SCALES AND ANALYSIS OF VARIANCE FOR GENERAL EDUCATION REDEFINED FACTOR IIB - BUSINESS MANAGEMENT

| Factor IIB | Loading | Mean | Factor IIB | Loading | Mean |
|---|---|---|---|---|---|
| 1. Banker | -.786 | 29.5 | 6. Office Worker | -.559 | 34.2 |
| 2. Purchasing Agent | -.734 | 35.8 | 7. Mortician | -.544 | 32.6 |
| 3. Real Estate Salesman | -.673 | 36.8 | 8. Pres. Manuf. Concern | -.368 | 23.1 |
| 4. Sales Manager | -.637 | 25.8 | | | |

Analysis of Variance

| Source of Variance | Sum of Squares | Degs. of Freedom | Mean Square | F Statistics | Approx. Probability |
|---|---|---|---|---|---|
| Between | 6870.18 | 2 | 3435.09 | 1.76 | 0.18 |
| Within | 244393.56 | 125 | 1955.15 | | |
| Total | 251263.74 | 127 | | | |

| | | | |
|---|---|---|---|
| N | 40 | 32 | 56 |
| Group | Completion | Alternate | Withdrawal |
| Mean | 211.48 | 230.06 | 214.93 |

No significant differences found between any of the means.

TABLE 5.19. SUMMARY OF INTEREST SCALES AND ANALYSIS OF VARIANCE FOR GENERAL EDUCATION SCIENCE REDEFINED FACTOR IIIA - TECHNICAL

| Factor IIIA | Factor Loading | Mean |
|---|---|---|
| 1. Industrial Arts Teacher | .820 | 32.0 |
| 2. Airplane Pilot | .812 | 41.6 |
| 3. Carpenter | .808 | 34.4 |
| 4. Farmer | .708 | 43.8 |
| 5. Forest Service Man | .647 | 31.3 |
| 6. Policeman | .641 | 35.6 |
| 7. Army Officer | .635 | 28.3 |
| 8. Production Manager | .590 | 34.3 |
| 9. Math-Science Teacher | .579 | 38.8 |
| 10. Printer | .525 | 38.2 |

Analysis of Variance

| Source of Variance | Sum of Squares | Degs. of Freedom | Mean Square | F Statistics | Approx. Probability |
|---|---|---|---|---|---|
| Between | 30315.50 | 2 | 15157.75 | 2.81 | 0.06 |
| Within | 674331.61 | 125 | 5394.65 | | |
| Total | 704647.12 | 127 | | | |

| N | 40 | 32 | 56 |
|---|---|---|---|
| Group | Completion | Alternate | Withdrawal |
| Mean | 346.45 | 385.44 | 353.55 |

No significant differences found between any of the means.

TABLE 5.20. SUMMARY OF INTEREST SCALE AND ANALYSIS OF VARIANCE FOR GENERAL EDUCATION SCIENCE REDEFINED FACTOR IVA - VETERINARIAN

| Factor IVA | Factor Loading | Mean |
|---|---|---|
| 1. Veterinarian | .580 | 35.1 |

Analysis of Variance

| Source of Variance | Sum of Squares | Degs. of Freedom | Mean Square | F Statistics | Approx. Probability |
|---|---|---|---|---|---|
| Between | 72.01 | 2 | 36.01 | 0.39 | 0.68 |
| Within | 11503.49 | 125 | 92.03 | | |
| Total | 11575.50 | 127 | | | |

| N | 40 | 32 | 56 |
|---|---|---|---|
| Group | Completion | Alternate | Withdrawal |
| Mean | 33.95 | 35.56 | 35.57 |

No significant differences found between any of the means.

TABLE 5.21. SUMMARY OF INTEREST RELATED SCALE AND ANALYSIS OF VARIANCE FOR GENERAL EDUCATION SCIENCE REDEFINED FACTOR V-SPECIALIZATION LEVEL

| Factor V | Factor Loading | Mean |
|---|---|---|
| 1. Specialization Level | .584 | 31.3 |

Analysis of Variance

| Source of Variance | Sum of Square | Degs. of Freedom | Mean Square | F Statistics | Approx. Probability |
|---|---|---|---|---|---|
| Between | 133.16 | 2 | 66.58 | 0.90 | 0.41 |
| Within | 9295.08 | 125 | 74.36 | | |
| Total | 9428.24 | 127 | | | |

| | | | |
|---|---|---|---|
| N | 40 | 32 | 56 |
| Group | Completion | Alternate | Withdrawal |
| Mean | 32.83 | 31.22 | 30.45 |

No significant differences found between any of the means.

Significant factors. Four interest or interest-related factors and all the intellective factors (the three SCAT scales and high school grade point average) satisfied the F statistic required at the .05 level of confidence.

The scales loading highest on factor IIIB and the analysis of variance are shown in Table 5.22.

Students who changed to an alternate program scored significantly lower than students who completed or withdrew from college on this factor. General Education Science students who changed to an alternate program seemed to have less interest in occupations emphasizing verbal-linguistic skills than either those who completed or withdrew from college.

Students who withdrew from college rather than change to an alternate program scored significantly lower on the computational factor. The mean differences between students who withdrew or completed the program was not statistically different. The scales loading highest on factor IVB and the analysis of variance is shown in Table 5.23.

### TABLE 5.22. SUMMARY OF INTEREST SCALES AND ANALYSIS OF VARIANCE FOR GENERAL EDUCATION SCIENCE REDEFINED FACTOR IIIB - VERBAL LINGUISTIC

| Factor IIIB | Factor Loading | Mean |
|---|---|---|
| 1. Advertising Man | -.790 | 27.0 |
| 2. Lawyer | -.786 | 27.4 |
| 3. Author-Journalist | -.689 | 29.3 |
| 4. Life Insurance Salesman | -.606 | 25.9 |

Analysis of Variance

| Source of Variance | Sum of Squares | Degs. of Freedom | Mean Square | F Statistics | Approx. Probability |
|---|---|---|---|---|---|
| Between | 6319.75 | 2 | 3159.88 | 5.02 | 0.01 |
| Within | 78689.93 | 125 | 629.52 | | |
| Total | 85009.68 | 127 | | | |

Scheffe's Post Hoc Analysis

| | | | |
|---|---|---|---|
| N | 40 | 56 | 32 |
| Group | Completion | Withdrawal | Alternate |
| Mean* | 113.90 | 112.61 | 96.97 |

*Means with common underlining do not differ significantly at the .01 probability level. Means not commonly underlined differ significantly at the .01 probability level.

### TABLE. 5.23 SUMMARY OF INTEREST SCALES AND ANALYSIS OF VARIANCE FOR GENERAL EDUCATION SCIENCE REDEFINED FACTOR IVB - COMPUTATIONAL

| Factor IV B | Factor Loading | Mean |
|---|---|---|
| 1. CPA Owner | -.683 | 20.7 |
| 2. Accountant | -.645 | 26.7 |
| 3. Senior CPA | -.529 | 35.4 |

Analysis of Variance

| Source of Variance | Sum of Squares | Degs. of Freedom | Mean Square | F Statistics | Approx. Probability |
|---|---|---|---|---|---|
| Between | 5385.09 | 2 | 2692.55 | 5.14 | 0.01 |
| Within | 65485.77 | 125 | 523.89 | | |
| Total | 70870.87 | 127 | | | |

Scheffe's Post Hoc Analysis

| | | | |
|---|---|---|---|
| N | 32 | 40 | 56 |
| Group | Alternate | Completion | Withdrawal |
| Mean* | 92.88 | 84.43 | 76.75 |

*Means with common underlining do not differ significantly at the .01 proability level. Means not commonly underlined differ significantly at the .01 probability level.

One might wish to speculate that students who dislike paper work, and are unable to persist in assigned tasks in an orderly fashion, would score low on this factor and that this would lead to possible withdrawal from college.

The occupational level scale was redefined as factor VI and this scale and the analysis of variance is shown in Table 5.24.

TABLE 5.24. SUMMARY OF INTEREST RELATED SCALE AND ANALYSIS OF VARIANCE FOR GENERAL EDUCATION SCIENCE REDEFINED FACTOR VI - OCCUPATIONAL

| Factor VI | Factor Loading | Mean |
|---|---|---|
| 1. Occupational Level | -.574 | 47.8 |

Analysis of Variance

| Source of Variance | Sum of Squares | Degs. of Freedom | Mean Square | F Statistics | Approx. Probability |
|---|---|---|---|---|---|
| Between | 606.06 | 2 | 303.03 | 7.48 | 0.00 |
| Within | 5060.66 | 125 | 40.49 | | |
| Total | 5666.72 | 127 | | | |

Scheffe's Post Hoc Analysis

| | | | |
|---|---|---|---|
| N | 40 | 32 | 56 |
| Group | Completion | Alternate | Withdrawal |
| Mean* | 50.78 | 47.78 | 45.68 |

*Means with common underlining do not differ significantly at the .01 probability level. Means not commonly underlined differ significantly at the .01 probability level.

The analysis of variance F statistic was significant at the .001 probability level. The occupational level score for students who completed one of the General Education Science programs, but not statistically different from those who changed to an alternate program. Basically this could be interpreted as implying that the occupational aspiration level was not as high for students who withdrew as for those who completed a program.

Students who completed one of the General Education Science programs scored significantly lower than students who changed to an alternate program on the masculinity-femininity factor. The masculinity-femininity factor, redefined as fattor VII, is presented in Table 5.25 along with the appropriate analysis of variance

TABLE 5.25. SUMMARY OF INTEREST RELATED SCALE AND ANALYSIS OF VARIANCE FOR GENERAL EDUCATION SCIENCE REDEFINED FACTOR VII - MASCULINITY-FEMININITY

| Factor VII | Factor Loading | Mean |
|---|---|---|
| 1. Masculinity-Femininity | .802 | 34.4 |

Analysis of Variance

| Source of Variance | Sum of Squares | Degs. of Freedom | Mean Square | F Statistics | Approx. Probability |
|---|---|---|---|---|---|
| Between | 346.01 | 2 | 173.01 | 3.39 | 0.04 |
| Within | 6379.23 | 125 | 51.03 | | |
| Total | 6725.24 | 127 | | | |

Scheffe's Post Hoc Analysis

| N | 32 | 56 | 40 |
|---|---|---|---|
| Group | Alternate | Withdrawal | Completion |
| Mean* | 54.50 | 51.64 | 50.13 |

*Means with common underlining do not differ significantly at the .01 probability level. Means not commonly underlined differ significantly at the .01 probability level.

The findings imply that successful General Education Science students are more likely to enjoy arts, music, books, and more likely to want an indoor job and be considerate of others than students who change. It might also be said that the successful General Education Science student is less restless and impatient with his surroundings than those who change to an alternate program.

All three SCAT scores (verbal, quantitative, and total) differentiated between the students who successfully complete one of the General Education Science programs from those who changed to an alternate program or withdrew from college. The SCAT scores and analysis of variance procedures are shown in Tables 5.26, 5.27, and 5.28.

TABLE 5.26. SUMMARY OF VERBAL ABILITY SCALE AND ANALYSIS OF VARIANCE FOR GENERAL EDUCATION SCIENCE REDEFINED FACTOR VIII - SCAT V

| Factor VIII | Factor Loading | Mean |
|---|---|---|
| 1. SCAT V | -.485 | 29.8 |

Analysis of Variance

| Source of Variance | Sum of Squares | Degs. of Freedom | Mean Square | F Statistics | Approx. Probability |
|---|---|---|---|---|---|
| Between | 1000.75 | 2 | 500.37 | 8.29 | 0.00 |
| Within | 7543.87 | 125 | 60.35 | | |
| Total | 8544.62 | 127 | | | |

Scheffe's Post Hoc Analysis

| | | | |
|---|---|---|---|
| N | 40 | 56 | 32 |
| Group | Completion | Withdrawal | Alternate |
| Mean* | 34.20 | 28.25 | 28.03 |

*Means with common underlining do not differ significantly at the .01 probability level. Means not commonly underlined differ significantly at the .01 probability level.

TABLE 5.27. SUMMARY OF QUANTITATIVE ABILITY SCALE AND ANALYSIS OF VARIANCE FOR GENERAL EDUCATION SCIENCE REDEFINED FACTOR IX - SCAT Q

| Factor IX | Factor Loading | Mean |
|---|---|---|
| 1. SCAT Q | -.584 | 38.2 |

Analysis of Variance

| Source of Variance | Sum of Squares | Degs. of Freedom | Mean Square | F Statistics | Approx. Probability |
|---|---|---|---|---|---|
| Between | 999.55 | 2 | 499.77 | 8.15 | 0.00 |
| Within | 7668.33 | 125 | 61.35 | | |
| Total | 8667.88 | 127 | | | |

Scheffe's Post Hoc Analysis

| | | | |
|---|---|---|---|
| N | 40 | 32 | 56 |
| Group | Completion | Alternate | Withdrawal |
| Mean* | 42.43 | 38.00 | 35.91 |

*Means with common underlining do not differ significantly at the .01 probability level. Means not commonly underlined differ significantly at the .01 probability level.

TABLE 5.28. SUMMARY OF TOTAL ABILITY SCALE AND ANALYSIS OF VARIANCE FOR GENERAL EDUCATION SCIENCE REDEFINED FACTOR X - SCAT T

| Factor X | Factor Loading | Mean |
|---|---|---|
| 1. SCAT T | -.536 | 67.2 |

Analysis of Variance

| Source of Variance | Sum of Squares | Degs. of Freedom | Mean Square | F Statistics | Approx. Probability |
|---|---|---|---|---|---|
| Between | 3932.57 | 2 | 1966.28 | 12.42 | 0.00 |
| Within | 19791.43 | 125 | 158.33 | | |
| Total | 23723.99 | 127 | | | |

Scheffe's Post Hoc Analysis

| | | | |
|---|---|---|---|
| N | 40 | 32 | 56 |
| Group | Completion | Alternate | Withdrawal |
| Mean* | 76.65 | 66.03 | 64.11 |

*Means with common underlining do not differ significantly at the .01 probability level. Means not commonly underlined differ significantly at the .01 probability level.

In each case the F statistic was significant at the .001 probability level.

Students who change to alternate programs or withdraw from college do not seem to have as much verbal and quantitative ability as those students who complete one of the General Education Science programs.

The same results were reflected when the high school grade point average was examined. The high school grade point, redefined as factor XI, and the analysis of variance procedure is shown in Table 5.29.

Students who complete one of the General Education Science programs had a statistically significant more successful high school background than those who withdraw from college or changed to an alternate program.

Six of the redefined factors did not statistically differentiate between the student who completed, changed, or withdrew from one of the General Education Science programs. These were the factors labeled as social service, biological physical science, business management, technical, veterinarian, and specialization level.

TABLE 5.29. SUMMARY OF HS GPA AND ANALYSIS OF VARIANCE FOR GENERAL EDUCATION SCIENCE REDEFINED FACTOR XI - ACHIEVEMENT

| Factor XI | Factor Loading | Mean |
|---|---|---|
| 1. H.S. GPA | -.365 | 2.13 |

Analysis of Variance

| Source of Variance | Sum of Squares | Degs. of Freedom | Mean Square | F Statistics | Approx. Probability |
|---|---|---|---|---|---|
| Between | 3.84 | 2 | 1.92 | 7.35 | 0.00 |
| Within | 32.68 | 125 | 0.26 | | |
| Total | 36.53 | 127 | | | |

Scheffe's Post Hoc Analysis

| | | | |
|---|---|---|---|
| N | 40 | 56 | 32 |
| Group | Completion | Withdrawal | Alternate |
| Mean* | 2.37 | 2.02 | 1.97 |

*Means with common underlining do not differ significantly at the .01 probability level. Means not commonly underlined differ significantly at the .01 probability level.

Examination of the significant redefined factors suggests that one interest factor, verbal linguistic (F IIIB), differentiated General Education Science students who changed to alternate programs from those who completed or withdrew from college. The other interest factor, computational (F IVB), as well as the two interest related factors, occupational level (F VI) and masculinity-femininity (F VII) differentiated the student who withdrew from college from the students who either completed a General Education Science program or changed to an alternate program. All the intellective factors, SCAT V (F VIII), SCAT Q (F IX) SCAT T (F X) and HS GPA (F XI) differentiated at a statistically significant level the student who withdrew from the students who either completed a General Education Science program or changed to an alternate program. In every case the withdrawal group had lower ability and HS GPA scores.

## Section 3 - General Education Non-Science

Rotation of the factors provided four factors which satisfied the criterion cited on page 22. Examination of the rotated factors for General Education Non-Science reveals that two of the four were bipolar. Factor I seems to be a pure social service oriented factor with all the social service scales and a few others that could be considered as strongly related to social science loading highest on this factor. The *physical science* and *biological science* occupations were predominate on the positive pole of the bipolar factor II. On the negative pole of the factor II were those occupations emphasizing *business management* and *business contact* functions. Factor III emphasizes the technical physically active occupations loading in one direction and the *verbal linguistic* occupations loading in the other direction. The intellectual variables were combined with two computational scales in factor IV.

*Non-significant factors.* Eight of the 14 redefined factors did not achieve an F that was statistically significant at the .05 level. In four of the eight the F was large enough to satisfy the .06 - .07 level of confidence. The redefined factors which were not significant were factors I (social service), factor IIA (biological-physical science), factor IIB (business management contact), factor IIIA (technical) factor IIIB (verbal-linguistic), factor IVB (painter), factor V (specialization level), and factor VI (occupational level). The scales and analysis of variance for each of the non-significant factors are presented in Table 5.30-5.37.

TABLE 5.30. SUMMARY OF INTEREST SCALES AND ANALYSIS OF VARIANCE FOR GENERAL EDUCATION NON SCIENCE REDEFINED FACTOR I - SOCIAL SERVICE

| Factor I | Loading | Mean | Factor I | Loading | Mean |
|---|---|---|---|---|---|
| 1. Soc. Worker | -.941 | 24.2 | 10. Public Adm. | -.793 | 29.4 |
| 2. YMCA Sec. | -.878 | 22.0 | 11. Bus. Educ. Tchr. | -.778 | 31.0 |
| 3. Sch. Supt. | -.869 | 21.9 | | | |
| 4. Rehab. Counselor | -.860 | 28.3 | 12. YMCA Phys. Dir. | -.777 | 27.1 |
| 5. Chamber of Com. Exec. | -.858 | 33.5 | 13. Credit Mgr. | -.771 | 33.7 |
| 6. Personnel Dir. | -.855 | 27.5 | 14. Optometrist | -.762 | 32.0 |
| 7. Music Tchr. | -.852 | 26.8 | 15. Phys. Therapist | -.705 | 30.5 |
| 8. Soc. Sci. Tchr. | -.846 | 34.5 | 16. Librarian | -.683 | 22.7 |
| 9. Minister | -.839 | 17.5 | 17. Psychiatrist | -.683 | 22.7 |

Analysis of Variance

| Source of Variance | Sum of Squares | Degs. of Freedom | Mean Square | F Statistics | Approx. Probability |
|---|---|---|---|---|---|
| Between | 47718.32 | 2 | 23859.16 | 1.05 | 0.35 |
| Within | 6151296.53 | 270 | 22782.58 | | |
| Total | 6199014.84 | 272 | | | |

| N | 103 | 46 | 124 |
|---|---|---|---|
| Group | Completion | Alternate | Withdrawal |
| Mean | 478.71 | 441.57 | 469.70 |

No significant differences found between any of the means.

TABLE 5.31. SUMMARY OF INTEREST SCALES AND ANALYSIS OF VARIANCE FOR GENERAL EDUCATION NON-SCIENCE REDEFINED FACTOR IIA - BIOLOGICAL-PHYSICAL SCIENCE

| Factor IIA | Loading | Mean | Factor IIA | Loading | Mean |
|---|---|---|---|---|---|
| 1. Biologist | .897 | 20.3 | 8. Dentist | .707 | 27.5 |
| 2. Physician | .854 | 28.2 | 9. Mus. Performer | .686 | 35.0 |
| 3. Chemist | .801 | 23.3 | 10. Psychologist | .649 | 19.1 |
| 4. Mathematician | .796 | 20.1 | 11. Engineer | .639 | 25.6 |
| 5. Physicist | .767 | 10.0 | 12. Art Teacher | .569 | 19.7 |
| 6. Architest | .760 | 24.9 | 13. Osteopath | .405 | 30.1 |
| 7. Artist | .749 | 25.8 | | | |

Analysis of Variance

| Source of Variance | Sum of Squares | Degs. of Freedom | Mean Square | F Statistics | Approx. Probability |
|---|---|---|---|---|---|
| Between | 13257.82 | 2 | 6628.91 | 0.63 | 0.53 |
| Within | 2843031.28 | 270 | 10529.75 | | |
| Total | 2856289.10 | 272 | | | |

| | | | |
|---|---|---|---|
| N | 103 | 46 | 124 |
| Group | Completion | Alternate | Withdrawal |
| Mean | 309.09 | 324.02 | 304.15 |

No significant differences found between any of the means.

TABLE 5.32. SUMMARY OF INTEREST SCALES AND ANALYSIS OF VARIANCE FOR GENERAL EDUCATION NON SCIENCE REDEFINED FACTOR IIB - BUSINESS MANAGEMENT CONTACT

| Factor IIB | Loading | Mean | Factor IIB | Loading | Mean |
|---|---|---|---|---|---|
| 1. Banker | -.712 | 33.5 | 6. Office Worker | -.638 | 35.6 |
| 2. Sales Mgr. | -.707 | 27.5 | 7. Life Insurance Salesman | -.598 | 32.2 |
| 3. Real Estate Salesman | -.677 | 41.1 | 8. Pres. Mfg. Concern | -.434 | 24.6 |
| 4. Purchasing Agent | -.660 | 34.4 | 9. Pharmacist | -.247 | 35.2 |
| 5. Mortician | -.648 | 35.5 | | | |

Analysis of Variance

| Source of Variance | Sum of Squares | Degs. of Freedom | Mean Square | F Statistics | Approx. Probability |
|---|---|---|---|---|---|
| Between | 367.79 | 2 | 183.89 | 0.06 | 0.94 |
| Within | 851269.49 | 270 | 3152.85 | | |
| Total | 851637.27 | 272 | | | |

| | | | |
|---|---|---|---|
| N | 103 | 46 | 124 |
| Group | Completion | Alternate | Withdrawal |
| Mean | 303.10 | 306.37 | 304.74 |

No significant differences found between any of the means.

TABLE 5.33. SUMMARY OF INTEREST SCALES AND ANALYSIS OF VARIANCE FOR GENERAL EDUCATION NON-SCIENCE REDEFINED FACTOR III A - TECHNICAL

| Factor IIIA | Loading | Mean | Factor IIIA | Loading | Mean |
|---|---|---|---|---|---|
| 1. Indus. Arts Tchr. | .829 | 26.2 | 6. Policeman | .730 | 33.9 |
| 2. Airplane Pilot | .768 | 34.0 | 7. Math-Sci. Tchr. | .694 | 33.1 |
| 3. Carpenter | .751 | 25.2 | 8. Army Officer | .646 | 25.3 |
| 4. Forest Service Man | .748 | 25.8 | 9. Veterinarian | .644 | 30.0 |
| 5. Farmer | .731 | 37.9 | 10. Senior CPA | .468 | 32.0 |

Analysis of Variance

| Source of Variance | Sum of Squares | Degs. of Freedom | Mean Square | F Statistics | Approx. Probability |
|---|---|---|---|---|---|
| Between | 32954.77 | 2 | 16477.38 | 2.74 | 0.07 |
| Within | 1623359.23 | 270 | 6012.44 | | |
| Total | 1656314.00 | 272 | | | |

| | | | |
|---|---|---|---|
| N | 103 | 46 | 124 |
| Group | Completion | Alternate | Withdrawal |
| Mean | 293.68 | 304.47 | 325.85 |

No significant differences found between any of the means.

TABLE 5.34. SUMMARY OF INTEREST SCALES AND ANALYSIS OF VARIANCE FOR GENERAL EDUCATION NON-SCIENCE REDEFINED FACTOR IIIB - VERBAL LINGUISTIC

| Factor IIIB | Factor Loading | Mean |
|---|---|---|
| 1. Advertising Man | -.816 | 31.7 |
| 2. Lawyer | -.785 | 31.9 |
| 3. Author-Journalist | -.733 | 31.0 |

Analysis of Variance

| Source of Variance | Sum of Squares | Degs. of Freedom | Mean Square | F Statistics | Approx. Probability |
|---|---|---|---|---|---|
| Between | 3301.08 | 2 | 1650.54 | 2.79 | 0.06 |
| Within | 159514.19 | 270 | 590.79 | | |
| Total | 162815.27 | 272 | | | |

| | | | |
|---|---|---|---|
| N | 103 | 46 | 124 |
| Group | Completion | Alternate | Withdrawal |
| Mean | 97.98 | 94.49 | 87.80 |

No significant differences found between any of the means.

### TABLE 5.35. SUMMARY OF INTEREST SCALE AND ANALYSIS OF VARIANCE FOR GENERAL EDUCATION NON-SCIENCE REDEFINED FACTOR IVB - PRINTER

| Factor IVB | Factor Loading | Mean |
|---|---|---|
| 1. Printer | -.436 | 35.9 |

Analysis of Variance

| Source of Variance | Sum of Squares | Degs. of Freedom | Mean Square | F Statistics | Approx. Probability |
|---|---|---|---|---|---|
| Between | 13.00 | 2 | 6.50 | 0.10 | 0.90 |
| Within | 16776.00 | 270 | 62.13 | | |
| Total | 16789.00 | 272 | | | |

| N | 103 | 46 | 124 |
|---|---|---|---|
| Group | Completion | Alternate | Withdrawal |
| Mean | 35.78 | 36.37 | 36.07 |

No significant differences found between any of the means.

### TABLE 5.36. SUMMARY OF INTEREST RELATED SCALE AND ANALYSIS OF VARIANCE FOR GENERAL EDUCATION NON-SCIENCE REDEFINED FACTOR V - SPECIALIZATION LEVEL

| Factor V | Factor Loading | Mean |
|---|---|---|
| 1. Specialization Level | -.681 | 32.0 |

Analysis of Variance

| Source of Variance | Sum of Squares | Degs. of Freedom | Mean Squares | F Statistics | Approx. Probability |
|---|---|---|---|---|---|
| Between | 376.78 | 2 | 188.39 | 2.75 | 0.07 |
| Within | 18495.77 | 270 | 68.50 | | |
| Total | 18872.56 | 272 | | | |

| N | 103 | 46 | 124 |
|---|---|---|---|
| Group | Completion | Alternate | Withdrawal |
| Mean | 33.45 | 31.48 | 30.90 |

No significant differences found between any of the means.

TABLE 5.37. SUMMARY OF INTEREST RELATED SCALE AND ANALYSIS OF VARIANCE FOR GENERAL EDUCATION NON-SCIENCE REDEFINED FACTOR VI - OCCUPATIONAL LEVEL

| Factor VI | Factor Loading | Mean |
|---|---|---|
| 1. Occupational Level | .559 | 49.5 |

Analysis of Variance

| Source of Variance | Sum of Squares | Degs. of Freedom | Mean Square | F Statistics | Approx. Probability |
|---|---|---|---|---|---|
| Between | 240.87 | 2 | 120.44 | 2.67 | 0.07 |
| Within | 12178.12 | 270 | 45.10 | | |
| Total | 12419.00 | 272 | | | |

| | | | |
|---|---|---|---|
| N | 103 | 46 | 124 |
| Group | Completion | Alternate | Withdrawal |
| Mean | 50.58 | 49.33 | 48.52 |

No significant differences found between any of the means.

When the means of the variables loading highest on each of the non-significant factors were examined, the following observation can be made. Regardless of outcome, completing, changing, or withdrawing from college, the General Education Non-Science student tended to have neutral feelings toward: (1) social service occupations, (F I); (2) biological-physical science work, (F IIIA); (3) business management conctact occupations, (F IIB); (4) technical fields (F IIIA); (5) verbal-linguistic work, (F IIIB); and painter, (F IVB). The General Education Non-Science students generally had low scores on the specialization level (F V) and occupational level (F VI) scales. The latter two scores implies unwillingness to specify a goal and basically low occupational aspiration level when compared to outside norm groups.

Significant factors. One interest and one interest related factor and all intellective (verbal, quantitative, and total ability scores and high school grade point average) factors satisfied the F requirement at the .05 probability level.

The interest scales and results of analysis of variance for factor IVA are presented in Table 5.38.

## TABLE 5.38. SUMMARY OF INTEREST SCALES AND ANALYSIS OF VARIANCE FOR GENERAL EDUCATION NON-SCIENCE REDEFINED FACTOR IVA - COMPUTATIONAL

| Factor IVA | Factor Loading | Mean |
|---|---|---|
| 1. CPA Owner | .693 | 19.8 |
| 2. Accountant | .580 | 25.5 |

### Analysis of Variance

| Source of Variance | Sum of Squares | Degs. of Freedom | Mean Square | F Statistics | Approx. Probability |
|---|---|---|---|---|---|
| Between | 2690.64 | 2 | 1345.32 | 5.87 | 0.0 |
| Within | 61861.31 | 270 | 229.12 | | |
| Total | 64551.94 | 272 | | | |

### Scheffe's Post Hoc Analysis

| N | 103 | 46 | 124 |
|---|---|---|---|
| Group | Completion | Alternate | Withdrawal |
| Mean* | 47.92 | 48.59 | 41.84 |

*Means with common underlining do not differ significantly at the .01 probability level. Means not commonly underlined differ significantly at the .01 probability level.

As indicated in the General Education Science section the General Education Non-Science students who withdrew scored significantly lower on the computational factor. Both the completion and alternate group means were significantly higher than the withdrawal group on this factor. That students who withdraw are less willing to deal with paper work, are less orderly and systematic about completing assigned tasks when compared to students who stay in college could be strongly viewed as a possibility.

The masculinity-femininity scale and analysis of variance for factor VIII is presented in Table 5.39.

TABLE 5.39. SUMMARY OF INTEREST RELATED SCALE AND ANALYSIS OF VARIANCE FOR GENERAL EDUCATION NON-SCIENCE REDEFINED FACTOR VII - MASCULINITY-FEMININITY

| Factor VII | Factor Loading | Mean |
|---|---|---|
| 1. Masculinity-Femininity | .803 | 47.4 |

Analysis of Variance

| Source of Variance | Sum of Squares | Degs. of Freedom | Mean Square | F Statistics | Approx. Probability |
|---|---|---|---|---|---|
| Between | 710.37 | 2 | 355.19 | 6.00 | 0.00 |
| Within | 15989.61 | 270 | 59.22 | | |
| Total | 16699.99 | 272 | | | |

Scheffe's Post Hoc Analysis

| | | | |
|---|---|---|---|
| N | 46 | 124 | 103 |
| Group | Alternate | Withdrawal | Completion |
| Mean* | 50.33 | 47.86 | 45.72 |

*Means with common underlining do not differ significantly at the .01 probability level. Means not commonly underlined differ significantly at the .01 probability level.

Consistent with the General Education Science findings the General Education Non-Science student who completes his program scores significantly lower on masculinity than those who change to an alternate program. The mean differences between the withdrawal and completion groups, and between the alternate and withdrawal samples were not significantly different on this factor. The alternate group could be characterized as more aggressive, restless, and impatient; the completion group as more quiet, more interested in books, and more interested in music.

The SCAT verbal score significantly differentiated between the students who withdrew from those who completed their General Education Non-Science program. The SCAT V score and the analysis of variance is shown in Table 5.40.

The students who withdrew had a lower verbal aptitude score than students who completed one of the General Education Non-Science program.

TABLE 5.40. SUMMARY OF VERBAL ABILITY SCALE AND ANALYSIS OF VARIANCE FOR GENERAL EDUCATION NON-SCIENCE REDEFINED FACTOR VIII - VERBAL

| Factor VIII | Factor Loading | Mean |
|---|---|---|
| 1. SCAT V | .353 | 29.2 |

Analysis of Variance

| Source of Variance | Sum of Squares | Degs. of Freedom | Mean Square | F Statistics | Approx. Probability |
|---|---|---|---|---|---|
| Between | 1655.56 | 2 | 827.78 | 12.14 | 0.00 |
| Within | 18413.92 | 270 | 68.20 | | |
| Total | 20069.48 | | | | |

Scheffe's Post Hoc Analysis

| | | | |
|---|---|---|---|
| N | 103 | 46 | 124 |
| Group | Completion | Alternate | Withdrawal |
| Mean* | 32.08 | 29.11 | 26.65 |

*Means with common underlining do not differ significantly at the .01 probability level. Means not commonly underlined differ significantly at the .01 probability level.

The results for the final three factors are basically the same. In each case the withdrawal group has a significantly lower quantitative and total ability score, and a lower high school grade point average than both the completion and change to an alternate program groups. In Tables 5.41, 5.42, and 5.43 the quantitative and total ability scores, and high school grade point average and the respective analysis of variance results are presented.

The General Education Non-Science withdrawal group had the lowest quantitative and total ability scores with the completion group scoring highest and the change to an alternate program group scoring at an intermediate level. The withdrawal group was the only group with a high school average of less than a 2.00.

The results of this section of phase two would suggest that regardless of outcome General Education Non-Science students have similar occupational interests. Students who withdrew from General Education Non-Science programs had lower scores on the computational factor than students who changed to an alternate program or completed their program. Students who completed a General Education Non-Science program had a lower score on the masculinity-femininity factor than students who changed to an alternate program. Students who withdrew from a General Education Non-Science program had consistently lower verbal, quantitative, total ability scores and high school grade point average than students who continued in college.

TABLE 5.41. SUMMARY OF QUANTITATIVE SCALE AND ANALYSIS OF VARIANCE FOR GENERAL EDUCATION NON-SCIENCE REDEFINED FACTOR IX - QUANTITATIVE

| Factor IX | Factor Loading | Mean |
|---|---|---|
| 1. SCAT Q | .531 | 32.5 |

Analysis of Variance

| Source of Variance | Sum of Squares | Degs. of Freedom | Mean Square | F Statistics | Approx. Probability |
|---|---|---|---|---|---|
| Between | 2300.42 | 2 | 1150.21 | 16.68 | 0.00 |
| Within | 18613.82 | 270 | 68.94 | | |
| Total | 20914.24 | | | | |

Scheffe's Post Hoc Analysis

| | | | |
|---|---|---|---|
| N | 103 | 46 | 124 |
| Group | Completion | Alternate | Withdrawal |
| Mean* | 35.41 | 34.50 | 29.33 |

*Means with common underlining do not differ significantly at the .01 probability level. Means not commonly underlined differ significantly at the .01 probability level.

TABLE 5.42. SUMMARY OF TOTAL ABILITY SCALE AND ANALYSIS OF VARIANCE FOR GENERAL EDUCATION NON-SCIENCE REDEFINED FACTOR X - SCAT T

| Factor X | Factor Loading | Mean |
|---|---|---|
| 1. SCAT T | .541 | 61.6 |

Analysis of Variance

| Source of Variance | Sum of Squares | Degs. of Freedom | Mean Square | F Statistics | Approx. Probability |
|---|---|---|---|---|---|
| Between | 7777.33 | 2 | 3888.67 | 22.28 | 0.00 |
| Within | 47127.52 | 270 | 174.55 | | |
| Total | 54904.86 | | | | |

Scheffe's Post Hoc Analysis

| | | | |
|---|---|---|---|
| N | 103 | 46 | 124 |
| Group | Completion | Alternate | Withdrawal |
| Mean* | 67.49 | 63.61 | 55.90 |

*Means with common underlining do not differ significantly at the .01 probability level. Means not commonly underlined differ significantly at the .01 probability level.

TABLE 5.43. SUMMARY OF HS GPA AND ANALYSIS OF VARIANCE FOR GENERAL EDUCATION NON-SCIENCE REDEFINED FACTOR XI - ACHIEVEMENT

| Factor XI | Factor Loading | Mean |
|---|---|---|
| 1. HS HPA | .378 | 2.01 |

Analysis of Variance

| Source of Variance | Sum of Squares | Degs. of Freedom | Mean Square | F Statistics | Approx. Probability |
|---|---|---|---|---|---|
| Between | 3.36 | 2 | 1.68 | 5.52 | 0.00 |
| Within | 82.16 | 270 | 0.30 | | |
| Total | 85.51 | 272 | | | |

Scheffe's Post Hoc Analysis

| | | | |
|---|---|---|---|
| N | 103 | 46 | 124 |
| Group | Completion | Alternate | Withdrawal |
| Mean* | 2.07 | 2.06 | 1.84 |

*Means with common underlining do not differ significantly at the .01 probability level. Means not commonly underlined differ significantly at the .01 probability level.

## Section 4 - Collegiate Technical

Examination of the factor loadings for the five interpretable factors found for the Collegiate Technical sample indicates that three of the factors were bipolar in nature. Factor I has all of the scales in the social service family and several related service oriented occupational scales loading on the positive pole and the scales with highly technical-scientific professional values at the negative pole (physical science-abstract). Factor II was characterized by the technical-physically active occupational scales ( all of the SVIB family IV) in contrast to the business contact and verbal-linguistic occupations. Factor III emphasized those occupations that rely heavily on verbal expressive ability and personal contact on the one pole. The other pole of factor III reflected an attention to business detail in a systematic, orderly fashion. Factor IV was characterized by the relationship between intellectual and science-computational occupations. It was interesting to note that Collegiate Technical factor rotation had placed the intellectual emphasis scales with occupational scales that would be viewed as representing the upper echelon of scientific technical knowledge. Factor V reflects occupations that use biological-scientific knowledge in helping professions.

Non-significant factors. For analysis of variance purposes the general factors were redefined as 14 factors to enable examination of specific hypotheses. Eleven of the fifteen factors did not satisfy the F statistic required at the .05 level. They are: factor IA (social service); factor IB (physical science-abstract); factor IIA (technical); factor IIB (business contact); factor IIIA (business detail); factor IIIB (verbal expressive); factor V (biological science); factor VI (specialization level); factor VII (occupational level); factor VIII (masculinity-femininity); and factor X (quantitative). The scales loading highest on non-significant factors for the Collegiate Technical samples and the results of analysis of variance for each factor are presented in Tables 5.44 - 5.54.

TABLE 5.44. SUMMARY OF INTEREST SCALES AND ANALYSIS OF VARIANCE FOR COLLEGIATE TECHNICAL REDEFINED FACTOR IA - SOCIAL SERVICE

| Factor IA | Loading | Mean | Factor IA | Loading | Mean |
|---|---|---|---|---|---|
| 1. YMCA Sec. | .935 | 17.3 | 9. YMCA Phys. Dir. | .792 | 22.9 |
| 2. Bus. Educ. Tchr. | .923 | 26.7 | 10. Schl. Superintendent | .791 | 15.7 |
| 3. Credit Mgr. | .921 | 28.7 | 11. Optometrist | .742 | 26.4 |
| 4. Social Worker | .902 | 18.4 | 12. Music Tchr. | .733 | 25.0 |
| 5. Soc. Sci. Tchr. | .895 | 27.7 | 13. Minister | .713 | 13.6 |
| 6. Rehab. Counselor | .888 | 23.2 | 14. Phys. Therapist | .683 | 27.9 |
| 7. Chamber of Com. Exec. | .886 | 28.3 | 15. Public Admin. | .669 | 25.9 |
| 8. Personnel Dir. | .855 | 23.8 | 16. Office Worker | .639 | 34.4 |

Analysis of Variance

| Source of Variance | Sum of Squares | Degs. of Freedom | Mean Square | F Statistics | Approx. Probability |
|---|---|---|---|---|---|
| Between | 68898.62 | 2 | 34449.31 | 1.63 | 0.20 |
| Within | 1924609.86 | 91 | 21149.56 | | |
| Total | 1993508.48 | 93 | | | |

| | | | |
|---|---|---|---|
| N | 43 | 16 | 35 |
| Group | Completion | Alternate | Withdrawal |
| Mean | 381.81 | 432.88 | 353.80 |

No significant differences found between any of the means.

TABLE 5.45. SUMMARY OF INTEREST SCALES AND ANALYSIS OF VARIANCE FOR COLLEGIATE TECHNICAL REDEFINED FACTOR IB - PHYSICAL SCIENCE ABSTRACT

| Factor IB | Factor Loading | Mean |
|---|---|---|
| 1. Architect | -.683 | 34.0 |
| 2. Mathematician | -.680 | 21.6 |
| 3. Artist | -.651 | 30.7 |
| 4. Physicist | -.518 | 13.9 |
| 5. Dentist | -.500 | 32.2 |

Analysis of Variance

| Source of Variance | Sum of Squares | Degs. of Freedom | Mean Square | F Statistics | Approx. Probability |
|---|---|---|---|---|---|
| Between | 1560.34 | 2 | 780.17 | 0.38 | 0.68 |
| Within | 186161.62 | 91 | 2045.73 | | |
| Total | 187721.96 | 93 | | | |

| | | | |
|---|---|---|---|
| N | 43 | 16 | 35 |
| Group | Completion | Alternate | Withdrawal |
| Mean | 136.67 | 127.31 | 139.09 |

No significant differences found between any of the means.

TABLE 5.46. SUMMARY OF INTEREST SCALES AND ANALYSIS OF VARIANCE FOR COLLEGIATE TECHNICAL REDEFINED FACTOR IIA - TECHNICAL

| Factor IIA | Loading | Mean | Factor IIA | Loading | Mean |
|---|---|---|---|---|---|
| 1. Carpenter | .854 | 33.4 | 6. Printer | .700 | 38.8 |
| 2. Indus. Arts Tchr. | .824 | 31.3 | 7. Policeman | .679 | 33.5 |
| 3. Farmer | .820 | 39.9 | 8. Army Officer | .596 | 22.4 |
| 4. Airplane Pilot | .812 | 35.6 | 9. Math-Sci. Tchr. | .574 | 32.1 |
| 5. Forest Service Man | .720 | 33.0 | 10. Senior CPA | .522 | 30.7 |

Analysis of Variance

| Source of Variance | Sum of Squares | Degs. of Freedom | Mean Square | F Statistics | Approx. Probability |
|---|---|---|---|---|---|
| Between | 10037.05 | 2 | 5018.52 | 0.68 | 0.51 |
| Within | 672643.73 | 91 | 7391.69 | | |
| Total | 682680.78 | 93 | | | |

| | | | |
|---|---|---|---|
| N | 43 | 16 | 35 |
| Group | Completion | Alternate | Withdrawal |
| Mean | 323.07 | 348.94 | 320.00 |

No significant differences found between any of the means.

## TABLE 5.47. SUMMARY OF INTEREST SCALES AND ANALYSIS OF VARIANCE FOR COLLEGIATE TECHNICAL REDEFINED FACTOR IIB - BUSINESS CONTACT

| Factor IIB | Factor Loading | Mean |
|---|---|---|
| 1. Lawyer | -.780 | 27.8 |
| 2. Life Insurance Salesman | -.688 | 29.0 |
| 3. Sales Manager | -.589 | 29.8 |
| 4. Real Estate Salesman | -.550 | 39.5 |
| 5. Advertising Man | -.549 | 31.5 |
| 6. Pres. Manaufacturing Concern | -.516 | 25.6 |

Analysis of Variance

| Source of Variance | Sum of Squares | Degs. of Freedom | Mean Square | F Statistics | Approx. Probability |
|---|---|---|---|---|---|
| Between | 200.84 | 2 | 100.42 | 0.07 | 0.93 |
| Within | 131954.49 | 91 | 1450.05 | | |
| Total | 132155.33 | 93 | | | |

| | | | |
|---|---|---|---|
| N | 43 | 16 | 35 |
| Group | Completion | Alternate | Withdrawal |
| Mean | 181.95 | 180.31 | 184.29 |

No significant differences found between any of the means.

## TABLE 5.48. SUMMARY OF INTEREST SCALES AND ANALYSIS OF VARIANCE FOR COLLEGIATE TECHNICAL REDEFINED FACTOR III A - BUSINESS DETAIL

| Factor IIIA | Factor Loading | Mean |
|---|---|---|
| 1. Banker | .768 | 33.0 |
| 2. Purchasing Agent | .747 | 36.6 |
| 3. Mortician | .515 | 35.2 |

Analysis of Variance

| Source of Variance | Sum of Squares | Degs. of Freedom | Mean Square | F Statistics | Approx. Probability |
|---|---|---|---|---|---|
| Between | 841.51 | 2 | 420.76 | 1.02 | 0.36 |
| Within | 37480.91 | 91 | 411.88 | | |
| Total | 38322.43 | 93 | | | |

| | | | |
|---|---|---|---|
| N | 43 | 16 | 35 |
| Group | Completion | Alternate | Withdrawal |
| Mean | 107.88 | 100.88 | 102.49 |

No significant differences found between any of the means.

TABLE 5.49. SUMMARY OF INTEREST SCALES AND ANALYSIS OF VARIANCE FOR COLLEGIATE TECHNICAL REDEFINED FACTOR IIIB - VERBAL EXPRESSIVE

| Factor IIIB | Factor Loading | Mean |
|---|---|---|
| 1. Musician Performer | -.849 | 37.3 |
| 2. Art Teacher | -.819 | 23.7 |
| 3. Librarian | -.793 | 21.1 |
| 4. Psychologist | -.762 | 18.0 |
| 5. Biologist | -.690 | 21.5 |
| 6. Psychiatrist | -.690 | 21.3 |
| 7. Author-Journalist | -.594 | 31.0 |

Analysis of Variance

| Source of Variance | Sum of Squares | Degs. of Freedom | Mean Square | F Statistics | Approx. Probability |
|---|---|---|---|---|---|
| Between | 9440.82 | 2 | 4720.41 | 1.74 | 0.18 |
| Within | 246475.05 | 91 | 2708.52 | | |
| Total | 255915.87 | 93 | | | |

| | | | |
|---|---|---|---|
| N | 43 | 16 | 35 |
| Group | Completion | Alternate | Withdrawal |
| Mean | 166.05 | 194.50 | 173.71 |

No significant differences found between any of the means.

TABLE 5.50. SUMMARY OF INTEREST SCALES AND ANALYSIS OF VARIANCE FOR COLLEGIATE TECHNICAL REDEFINED FACTOR V - BIOLOGICAL SCIENCE

| Factor V | Factor Loading | Mean |
|---|---|---|
| 1. Osteopath | .769 | 28.8 |
| 2. Physician | .680 | 29.1 |
| 3. Veterinarian | .613 | 29.4 |
| 4. Pharmacist | .582 | 34.2 |

Analysis of Variance

| Source of Variance | Sum of Squares | Degs. of Freedom | Mean Square | F Statistics | Approx. Probability |
|---|---|---|---|---|---|
| Between | 1431.20 | 2 | 715.60 | 0.81 | 0.45 |
| Within | 80180.42 | 91 | 881.10 | | |
| Total | 81611.62 | 93 | | | |

| | | | |
|---|---|---|---|
| N | 43 | 16 | 35 |
| Group | Completion | Alternate | Withdrawal |
| Mean | 119.81 | 116.94 | 126.83 |

No significant differences found between any of the means.

TABLE 5.51. SUMMARY OF INTEREST RELATED SCALE AND ANALYSIS OF VARIANCE FOR COLLEGIATE TECHNICAL REDEFINED FACTOR VI - SPECIALIZATION LEVEL

| Factor VI | Factor Loading | Mean |
|---|---|---|
| 1. Specialization Level | -.461 | 31.7 |

Analysis of Variance

| Source of Variance | Sum of Squares | Degs. of Freedom | Mean Square | F Statistics | Approx. Probability |
|---|---|---|---|---|---|
| Between | 39.59 | 2 | 19.80 | 0.33 | 0.72 |
| Within | 5497.23 | 91 | 60.41 | | |
| Total | 5536.82 | 93 | | | |

| | | | |
|---|---|---|---|
| N | 43 | 16 | 35 |
| Group | Completion | Alternate | Withdrawal |
| Mean | 32.07 | 32.13 | 30.74 |

No significant differences found between any of the means.

TABLE 5.52. SUMMARY OF INTEREST RELATED SCALE AND ANALYSIS OF VARIANCE FOR COLLEGIATE TECHNICAL REDEFINED FACTOR VII - OCCUPATIONAL LEVEL

| Factor VII | Factor Loading | Mean |
|---|---|---|
| 1. Occupational Level | -.813 | 48.0 |

Analysis of Variance

| Source of Variance | Sum of Squares | Degs. of Freedom | Mean Square | F Statistics | Approx. Probability |
|---|---|---|---|---|---|
| Between | 151.17 | 2 | 75.58 | 1.21 | 0.30 |
| Within | 5687.74 | 91 | 62.50 | | |
| Total | 5838.90 | 93 | | | |

| | | | |
|---|---|---|---|
| N | 43 | 16 | 35 |
| Group | Completion | Alternate | Withdrawal |
| Mean | 49.35 | 46.75 | 46.83 |

No significant differences found between any of the means.

TABLE 5.53. SUMMARY OF INTEREST RELATED SCALE AND ANALYSIS OF VARIANCE FOR COLLEGIATE TECHNICAL REDEFINED FACTOR VIII - MASCULINITY-FEMININITY

| Factor VIII | Factor Loading | Mean |
|---|---|---|
| 1. Masculinity-Femininity | .640 | 47.3 |

Analysis of Variance

| Source of Variance | Sum of Squares | Degs. of Freedom | Mean Square | F Statistics | Approx. Probability |
|---|---|---|---|---|---|
| Between | 64.52 | 2 | 32.26 | 0.34 | 0.71 |
| Within | 8634.89 | 91 | 94.89 | | |
| Total | 8599.40 | 93 | | | |

| | | | |
|---|---|---|---|
| N | 43 | 16 | 35 |
| Group | Completion | Alternate | Withdrawal |
| Mean | 47.60 | 45.81 | 48.23 |

No significant differences found between any of the means.

TABLE 5.54. SUMMARY OF QUANTITATIVE SCALE AND ANALYSIS OF VARIANCE FOR COLLEGIATE TECHNICAL REDEFINED FACTOR X - QUANTITATIVE

| Factor X | Factor Loading | Mean |
|---|---|---|
| 1. SCAT Q | -.623 | 33.8 |

Analysis of Variance

| Source of Variance | Sum of Squares | Degs. of Freedom | Mean Square | F Statistics | Approx. Probability |
|---|---|---|---|---|---|
| Between | 344.45 | 2 | 172.22 | 2.61 | 0.08 |
| Within | 5998.29 | 91 | 65.92 | | |
| Total | 6342.73 | 93 | | | |

| | | | |
|---|---|---|---|
| N | 43 | 16 | 35 |
| Group | Completion | Alternate | Withdrawal |
| Mean | 35.60 | 35.31 | 31.57 |

No significant differences found between any of the means.

Examination of the scale means on the various non-significant factors suggest that Collegiate Technical students, regardless of whether they complete, change to an alternate program, or withdraw from college, expressed generally neutral feelings about: (1) social service (F IA) related occupations, (2) physical science-abstract fields (F IB), (3) business contact occupations (F IIB), (4) verbal expressive fields (F IIIB), and (5) biological science fields (F V). Generally Collegiate Technical students had positive feelings about business detail (F IIIA) and technical (F IIA) related fields. Collegiate technical students scored consistently low on the interest related scales; specialization level (F VI), occupational level (F VII), and masculinity-femininity scale (F VII). The implication seems to be that Collegiate Technical students generally were interested in quiet activities such as books, music, and art. The mean SCAT quantitative score for the Collegiate Technical group was in the high average range.

Significant factors. One interest factor and three intellective variables (SCAT verbal, SCAT total, and high school grade point average) obtained a F statistic required for the .01 probability level.

The scale loading highest on factor IV and the analysis of variance are presented in Table 5.55.

TABLE 5.55. SUMMARY OF INTEREST SCALES AND ANALYSIS OF VARIANCE FOR COLLEGIATE TECHNICAL REDEFINED FACTOR IV - COMPUTATIONAL-SCIENCE

| Factor IV | Factor Loading | Mean |
|---|---|---|
| 1. CPA Owner | -.693 | 19.0 |
| 2. Engineer | -.676 | 31.8 |
| 3. Chemist | -.664 | 28.1 |
| 4. Production Manager | -.611 | 33.3 |
| 5. Accountant | -.514 | 26.6 |

Analysis of Variance

| Source of Variance | Sum of Squares | Degs. of Freedom | Mean Square | F Statistics | Approx. Probability |
|---|---|---|---|---|---|
| Between | 12663.44 | 2 | 6331.72 | 4.80 | 0.01 |
| Within | 120108.06 | 91 | 1319.87 | | |
| Total | 132771.50 | 93 | | | |

Scheffe's Post Hoc Analysis

| | | | |
|---|---|---|---|
| N | 43 | 16 | 35 |
| Group | Completion | Alternate | Withdrawal |
| Mean* | 152.14 | 129.13 | 128.71 |

*Means with common underlining do not differ significantly at the .01 probability level. Means not commonly underlined differ significantly at the .01 probability level.

Students who completed their Collegiate Technical programs had a significantly higher score on the computational science factor than both the change to an alternate program and the withdrawal group. Again as with both the General Education Science and General Education Non-Science groups a factor with computational scales loading high differentiated between students who completed a program and those who did not.

The three intellectual factors, SCAT V, SCAT T and high school grade point average are presented along with the respective analysis of variance in Tables 5.56, 5.57, and 5.58. These factors significantly differentiated students who withdrew from those who continued their college education.

TABLE 5.56 SUMMARY OF VERBAL ABILITY SCALE AND ANALYSIS OF VARIANCE FOR COLLEGIATE TECHNICAL REDEFINED FACTOR IX - VERBAL

| Factor IX | Factor Loading | Mean |
|---|---|---|
| 1. SCAT V | .304 | 29.0 |

Analysis of Variance

| Source of Variance | Sum of Squares | Degs. of Freedom | Mean Square | F Statistics | Approx. Probability |
|---|---|---|---|---|---|
| Between | 455.43 | 2 | 227.72 | 5.29 | 0.01 |
| Within | 3914.40 | 91 | 43.02 | | |
| Total | 4369.83 | 93 | | | |

Scheffe's Post Hoc Analysis

| N | 16 | 43 | 35 |
|---|---|---|---|
| Group | Alternate | Completion | Withdrawal |
| Mean* | 31.62 | 30.23 | 26.17 |

*Means with common underlining do not differ significantly at the .01 probability level. Means not commonly underlined differ significantly at the .01 probability level.

The Collegiate Technical withdrawal group consistently scored lower on the SCAT verbal and SCAT total ability factors than either the change to alternate program or the completion groups. The Collegiate Technical withdrawal sample had a high school grade point average below 2.00 and both the alternate sample and completion sample had above a 2.00.

## TABLE 5.57. SUMMARY OF TOTAL ABILITY SCALE AND ANALYSIS OF VARIANCE FOR COLLEGIATE TECHNICAL REDEFINED FACTOR XI - SCAT T

| Factor XI | Factor Loading | Mean |
|---|---|---|
| 1. SCAT T | -.554 | 62.9 |

Analysis of Variance

| Source of Variance | Sum of Squares | Degs. of Freedom | Mean Square | F Statistics | Approx. Probability |
|---|---|---|---|---|---|
| Between | 1457.94 | 2 | 728.97 | 5.57 | 0.01 |
| Within | 11909.77 | 91 | 130.88 | | |
| Total | 13367.71 | 93 | | | |

Scheffe's Post Hoc Analysis

| N | 16 | 43 | 35 |
|---|---|---|---|
| Group | Alternate | Completion | Withdrawal |
| Mean* | 66.94 | 65.84 | 58.03 |

*Means with common underlining do not differ significantly at the .01 probability level. Means not commonly underlined differ significantly at the .01 probability level.

## TABLE 5.58 SUMMARY OF HS GPA AND ANALYSIS OF VARIANCE FOR COLLEGIATE TECHNICAL REDEFINED FACTOR XII - ACHIEVEMENT

| Factor XII | Factor Loading | Mean |
|---|---|---|
| 1. HS GPA | -.276 | 2.04 |

Analysis of Variance

| Source of Variance | Sum of Squares | Degs. of Freedom | Mean Square | F Statistics | Approx. Probability |
|---|---|---|---|---|---|
| Between | 2.05 | 2 | 1.02 | 4.67 | 0.01 |
| Within | 19.95 | 91 | 0.22 | | |
| Total | 21.99 | 93 | | | |

Scheffe's Post Hoc Analysis

| N | 16 | 43 | 35 |
|---|---|---|---|
| Group | Alternate | Completion | Withdrawal |
| Mean* | 2.15 | 2.13 | 1.83 |

*Means with common underlining do not differ significantly at the .01 probability level. Means not commonly underlined differ significantly at the .01 probability level.

Collegiate Technical students, regardless of eventual outcome, had similar social service, physical science-abstract, technical, business contact, business detail, verbal expressive and biological science occupational interest. They also had similar low interest related scores on the specialization level, occupational level, and masculinity-femininity scales. The SCAT quantitative scores were similar for the completion, alternate, and withdrawal groups.

The Collegiate Technical completion group scored significantly higher on the computational science interest factor. The completion and alternate program samples scored significantly higher than the withdrawal group on the SCAT verbal, SCAT total and high school grade point average factors.

## Section 5 - Trade and Industrial

Five general factors satisfied the established criterion. While not as strong as some of the bipolar factors already examined for other groups, four of the five rotated factors for the Trade and Industrial group were as bipolar. Factor I brings together all the social service occupations and a majority of the business detail occupations loading in one direction. The three occupations (architect, mathematician, and artist) loading in the other direction seem to reflect basically a physical science orientation. On factor II the biological science and verbal expressive occupations predominate on the pole emphasizing a strong professional orientation. The two occupations (purchasing agent and banker) loading in the other direction suggest a business detail orientation. All the technical, physically active occupations load in one direction on factor III and two occupations (advertising man and lawyer) characterizing verbal linguistic skills load at the other end. Factor IV emphasizes the intellectual variables, supported by chemist and CPA owner scales (computational-science) at one pole and the business contact scales at the other. Only one common thread running through the scales loading highest on factor V seemed apparent. The occupations seemed to reflect a need to be in charge or responsible for specific operations (business management). The general factors can be found in appendix D.

Non-significant factors. The general factors were redefined as 16 specific factors for analysis of variance purposes. Eight of the redefined factors did not achieve the $F$ statistic required at the .05 level of probability. These eight factors were: factor IA (social service); factor IIB (business detail); factor IVB (computational science); factor VI (specialization level); factor X (SCAT Q); and factor XI (SCAT T). The scales loading highest on each factor and the analysis of variance are presented in Tables 5.59 through 5.66 respectively.

TABLE 5.59. SUMMARY OF INTEREST SCALES AND ANALYSIS OF VARIANCE FOR TRADE AND INDUSTRY REDEFINED FACTOR IA - SOCIAL SERVICE

| | Factor IA | Factor Loading | Mean |
|---|---|---|---|
| 1. | Bus. Educ. Teacher | .939 | 26.4 |
| 2. | YMCA Secretary | .938 | 14.9 |
| 3. | Credit Manager | .937 | 28.8 |
| 4. | Chamber of Commerce Exec. | .925 | 26.9 |
| 5. | Social Worker | .924 | 17.3 |
| 6. | Personnel Director | .885 | 22.3 |
| 7. | Rehabilitation Counselor | .879 | 22.2 |
| 8. | Social Science Teacher | .877 | 26.3 |
| 9. | Music Teacher | .837 | 21.9 |
| 10. | YMCA Physical Director | .832 | 22.2 |
| 11. | School Superintendent | .825 | 13.4 |
| 12. | Minister | .806 | 11.6 |
| 13. | Physical Therapist | .806 | 30.8 |
| 14. | Public Administrator | .779 | 25.1 |
| 15. | Optometrist | .762 | 29.8 |
| 16. | Office Worker | .741 | 34.0 |
| 17. | Army Officer | .644 | 27.9 |
| 18. | Librarian | .592 | 17.6 |
| 19. | Math-Science Teacher | .569 | 34.2 |
| 20. | Accountant | .564 | 24.7 |
| 21. | Senior C.P.A. | .546 | 32.5 |

Analysis of Variance

| Source of Variance | Sum of Squares | Degs. of Freedom | Mean Square | F Statistics | Approx. Probability |
|---|---|---|---|---|---|
| Between | 94419.71 | 2 | 47209.85 | 1.58 | 0.21 |
| Within | 8745764.65 | 292 | 29951.25 | | |
| Total | 8840184.36 | 294 | | | |

| | | | |
|---|---|---|---|
| N | 173 | 20 | 102 |
| Group | Completion | Alternate | Withdrawal |
| Mean | 498.65 | 571.00 | 503.19 |

No significant differences found between any of the means.

TABLE 5.60. SUMMARY OF INTEREST SCALES AND ANALYSIS OF VARIANCE FOR TRADE AND INDUSTRY REDEFINED FACTOR IB - PHYSICAL SCIENCE

| Factor IB | Factor Loading | Mean |
|---|---|---|
| 1. Artist | -.703 | 28.3 |
| 2. Architect | -.628 | 33.2 |
| 3. Mathematician | -.594 | 22.3 |
| 4. Physicist | -.487 | 16.7 |

Analysis of Variance

| Source of Variance | Sum of Squares | Degs. of Freedom | Mean Square | F Statistics | Approx. Probability |
|---|---|---|---|---|---|
| Between | 2200.44 | 2 | 1100.22 | 0.78 | 0.46 |
| Within | 409354.29 | 292 | 1401.90 | | |
| Total | 411554.73 | 294 | | | |

| N | 173 | 20 | 102 |
|---|---|---|---|
| Group | Completion | Alternate | Withdrawal |
| Mean | 104.57 | 93.55 | 104.01 |

No significant differences found between any of the means.

TABLE 5.61. SUMMARY OF INTEREST SCALES AND ANALYSIS OF VARIANCE FOR TRADE AND INDUSTRY REDEFINED FACTOR IIA - BIOLOGICAL SCIENCE-EXPRESSIVE

| Factor IIA | Loading | Mean | Factor IIA | Loading | Mean |
|---|---|---|---|---|---|
| 1. Biologist | .775 | 22.1 | 6. Psychologist | .622 | 17.0 |
| 2. Mus. Performer | .757 | 35.1 | 7. Author-Journalist | .558 | 28.1 |
| 3. Art Tchr. | .744 | 19.0 | 8. Dentist | .539 | 32.7 |
| 4. Physician | .720 | 31.1 | 9. Osteopath | .497 | 31.3 |
| 5. Psychiatrist | .687 | 20.6 | | | |

Analysis of Variance

| Source of Variance | Sum of Square | Degs. of Freedom | Mean Square | F Statistics | Approx. Probability |
|---|---|---|---|---|---|
| Between | 2957.44 | 2 | 1478.72 | 0.56 | 0.57 |
| Within | 767336.17 | 292 | 2627.86 | | |
| Total | 770293.61 | 294 | | | |

| N | 173 | 20 | 102 |
|---|---|---|---|
| Group | Completion | Alternate | Withdrawal |
| Mean | 237.74 | 233.30 | 241.21 |

No significant differences found between any of the means.

### TABLE 5.62. SUMMARY OF INTEREST SCALES AND ANALYSIS OF VARIANCE FOR TRADE AND INDUSTRY REDEFINED FACTOR IIB - BUSINESS DETAIL

| Factor IIB | Factor Loading | Mean |
|---|---|---|
| 1. Purchasing Agent | -.690 | 37.8 |
| 2. Banker | -.625 | 33.3 |

Analysis of Variance

| Source of Variance | Sum of Squares | Degs. of Freedom | Mean Square | F Statistics | Approx. Probability |
|---|---|---|---|---|---|
| Between | 144.60 | 2 | 72.30 | 0.35 | 0.71 |
| Within | 60244.35 | 292 | 206.32 | | |
| Total | 60388.95 | 294 | | | |

| | | | |
|---|---|---|---|
| N | 173 | 20 | 102 |
| Group | Completion | Alternate | Withdrawal |
| Mean | 71.01 | 68.80 | 71.71 |

No significant differences found between any of the means.

### TABLE 5.63. SUMMARY OF INTEREST SCALES AND ANALYSIS OF VARIANCE FOR TRADE AND INDUSTRY REDEFINED FACTOR IVB - COMPUTATIONAL-SCIENCE

| Factor IVB | Factor Loading | Mean |
|---|---|---|
| 1. C.P.A. Owner | -.648 | 16.8 |
| 2. Chemist | -.578 | 30.4 |

Analysis of Variance

| Source of Variance | Sum of Squares | Degs. of Freedom | Mean Square | F Statistics | Approx. Probability |
|---|---|---|---|---|---|
| Between | 790.11 | 2 | 395.06 | 1.62 | 0.20 |
| Within | 71233.09 | 292 | 243.95 | | |
| Total | 72023.20 | 294 | | | |

| | | | |
|---|---|---|---|
| N | 173 | 20 | 102 |
| Group | Completion | Alternate | Withdrawal |
| Mean | 48.36 | 48.65 | 44.95 |

No significant differences found between any of the means.

3

### TABLE 5.64. SUMMARY OF INTEREST RELATED SCALE AND ANALYSIS OF VARIANCE FOR TRADE AND INDUSTRY REDEFINED FACTOR VI - SPECIALIZATION LEVEL

| Factor VI | Factor Loading | Mean |
|---|---|---|
| 1. Specialization Level | .607 | 30.0 |

Analysis of Variance

| Source of Variance | Sum of Squares | Degs. of Freedom | Mean Square | F Statistics | Approx. Probability |
|---|---|---|---|---|---|
| Between | 285.65 | 2 | 142.82 | 2.17 | 0.12 |
| Within | 19253.19 | 292 | 65.94 | | |
| Total | 19538.83 | 294 | | | |

| | | | |
|---|---|---|---|
| N | 173 | 20 | 102 |
| Group | Completion | Alternate | Withdrawal |
| Mean | 29.46 | 33.40 | 30.19 |

No significant differences found between any of the means.

### TABLE 5.65. SUMMARY OF QUANTITATIVE ABILITY SCALE AND ANALYSIS OF VARIANCE FOR TRADE AND INDUSTRY REDEFINED FACTOR X - QUANTITATIVE

| Factor X | Factor Loading | Mean |
|---|---|---|
| 1. SCAT Q | -.493 | 31.2 |

Analysis of Variance

| Source of Variance | Sum of Squares | Degs. of Freedom | Mean Square | F Statistics | Approx. Probability |
|---|---|---|---|---|---|
| Between | 79.36 | 2 | 39.68 | 0.53 | 0.59 |
| Within | 21692.07 | 292 | 74.29 | | |
| Total | 21771.44 | 294 | | | |

| | | | |
|---|---|---|---|
| N | 173 | 20 | 102 |
| Group | Completion | Alternate | Withdrawal |
| Mean | 31.36 | 32.45 | 30.54 |

No significant differences found between any of the means.

TABLE 5.66. SUMMARY OF TOTAL ABILITY SCALE AND ANALYSIS OF VARIANCE FOR TRADE AND INDUSTRY REDEFINED FACTOR XI - SCAT T

| Factor XI | Factor Loadings | Mean |
|---|---|---|
| 1. SCAT T | -.520 | 56.2 |

Analysis of Variance

| Source of Variance | Sum of Squares | Degs. of Freedom | Mean Square | F Statistics | Approx. Probability |
|---|---|---|---|---|---|
| Between | 820.08 | 2 | 410.04 | 2.18 | 0.11 |
| Within | 54825.60 | 292 | 187.76 | | |
| Total | 55645.68 | 294 | | | |

| | | | |
|---|---|---|---|
| N | 173 | 20 | 102 |
| Group | Completion | Alternate | Withdrawal |
| Mean | 56.73 | 62.00 | 55.08 |

No significant differences found between any of the means.

Examination of mean scale scores for each factor suggests the following. Generally, Trade and Industrial students achieved neutral scores on the (1) social service (F IA), (2) physical science (F IB), (3) biological science-expressive (F IIA), (4) computational-science (F IVB), occupational interest factors and neutral to positive scores on the (5) business detail interest factor (F IIB). Generally Trade and Industrial students scored low on the specialization level (F IV) which suggests an unwillingness to commit themselves to a specific goal. The SCAT quantitative and SCAT total ability scores were in the average range when the Trade and Industrial students were compared with an outside norm group.

Significant factors. An F statistic was obtained for eight of the 16 redefined factors which satisfied the .05 probability level. Four of these factors were occupation interest factors, two were interest related factors, and the final two were intellectual factors.

The scales loading highest on factor IIIA and the results of the analysis of variance are presented in Table 5.67.

TABLE 5.67. SUMMARY OF INTEREST SCALES AND ANALYSIS OF VARIANCE FOR TRADE AND INDUSTRY REDEFINED FACTOR IIIA - TECHNICAL

| Factor IIIA | Factor Loading | Mean |
|---|---|---|
| 1. Airplane Pilot | .831 | 44.1 |
| 2. Industrial Arts Teacher | .813 | 37.4 |
| 3. Forest Service Man | .778 | 31.7 |
| 4. Carpenter | .754 | 41.4 |
| 5. Farmer | .674 | 46.4 |
| 6. Veterinarian | .651 | 34.9 |
| 7. Policeman | .623 | 37.5 |
| 8. Engineer | .571 | 35.6 |
| 9. Production Manager | .537 | 37.5 |
| 10. Printer | .458 | 42.7 |

Analysis of Variance

| Source of Variance | Sum of Squares | Degs. of Freedom | Mean Square | F Statistics | Approx. Probability |
|---|---|---|---|---|---|
| Between | 24561.08 | 2 | 12280.54 | 3.08 | 0.05 |
| Within | 1165995.96 | 292 | 3993.14 | | |
| Total | 1190557.04 | 294 | | | |

Scheffe's Post Hoc Analysis

| | | | |
|---|---|---|---|
| N | 173 | 102 | 20 |
| Group | Completion | Withdrawal | Alternate |
| Mean* | 394.92 | 382.65 | 362.10 |

*Means with common underlining do not differ significantly at the .01 probability level. Means not commonly underlined differ significantly at the .01 probability level.

This factor, labeled technical, significantly differentiated the student who changed to an alternate program from those who completed a Trade and Industrial program. The students who completed a Trade and Industrial program scored higher than both the withdrawal and change to an alternate program group on this technical factor. The withdrawal sample did not significantly differ from either the completion or change samples.

Students who completed a Trade and Industrial program scored significantly lower on the verbal linguistic factor than either the withdrawal or change to an alternate program samples. The scales loading highest on this factor and the summary of analysis of variance are shown in Table 5.68.

TABLE 5.68. SUMMARY OF INTEREST SCALES AND ANALYSIS OF VARIANCE FOR TRADE AND INDUSTRY REDEFINED FACTOR IIIB - VERBAL-LINGUISTIC

| Factor IIIB | Factor Loading | Mean |
|---|---|---|
| 1. Advertising | -.640 | 27.4 |
| 2. Lawyer | -.512 | 24.1 |

Analysis of Variance

| Source of Variance | Sum of Squares | Degs. of Freedom | Mean Square | F Statistics | Approx. Probability |
|---|---|---|---|---|---|
| Between | 2111.66 | 2 | 1055.83 | 7.70 | 0.00 |
| Within | 40056.75 | 292 | 137.18 | | |
| Total | 42168.41 | 294 | | | |

Scheffe's Post Hoc Analysis

| | | | |
|---|---|---|---|
| N | 20 | 102 | 173 |
| Group | Alternate | Withdrawal | Completion |
| Mean* | 57.20 | 54.27 | 49.51 |

*Means with common underlining do not differ significantly at the .01 probability level. Means not commonly underlined differ significantly at the .01 probability level.

To express this another way, the higher the score on this verbal linguistic factor the better the chance that a Trade and Industrial student either changed to an alternate program or withdrew from college.

The business contact factor (factor IVA) scales and analysis of variance is presented in Table 5.69.

## TABLE 5.69. SUMMARY OF INTEREST SCALES AND ANALYSIS OF VARIANCE FOR TRADE AND INDUSTRY REDEFINED FACTOR IVA - BUSINESS CONTACT

| Factor IVA | Factor Loading | Mean |
|---|---|---|
| 1. Real Estate Salesman | .537 | 38.8 |
| 2. Life Insurance Salesman | .483 | 25.3 |

Analysis of Variance

| Source of Variance | Sum of Squares | Degs. of Freedom | Mean Square | F Statistics | Approx. Probability |
|---|---|---|---|---|---|
| Between | 1409.88 | 2 | 704.94 | 3.89 | 0.02 |
| Within | 52965.02 | 292 | 181.39 | | |
| Total | 54374.90 | 294 | | | |

Scheffe's Post Hoc Analysis

| | | | |
|---|---|---|---|
| N | 20 | 102 | 173 |
| Group | Alternate | Withdrawal | Completion |
| Mean* | 67.70 | 66.43 | 62.24 |

*Means with common underlining do not differ significantly at the .01 probability level. Means not commonly underlined differ significantly at the .01 probability level.

Similar to the verbal linguistic factor, Trade and Industrial students who completed their program scored significantly lower on the business contact factor than those who changed to an alternate program or withdrew from college.

Factor V scales and analysis of variance results are shown in Table 5.70.

The results of this analysis of variance seems to contribute to the findings of the verbal linguistic and business contact factors. Again the Trade and Industrial student who completed his program scored significantly lower, on this factor labeled business management, than those students who either changed to an alternate program or withdrew from college.

Trade and Industrial students who changed to an alternate program scored significantly higher on the occupational level (factor VII) scale than either those who completed or withdrew from college. The occupational level scale, redefined as factor VII, and the analysis of variance is presented in Table 5.71.

TABLE 5.70. SUMMARY OF INTEREST SCALES AND ANALYSIS OF VARIANCE FOR TRADE AND INDUSTRY REDEFINED FACTOR V - BUSINESS MANAGEMENT

| Factor V | Loading | Mean | Factor V | Loading | Mean |
|---|---|---|---|---|---|
| 1. Pres. Mfg. Concern | -.746 | 24.0 | 3. Mortician | -.553 | 34.6 |
| 2. Pharmacist | -.606 | 34.8 | 4. Sales Mgr. | -.510 | 26.7 |

Analysis of Variance

| Source of Variance | Sum of Squares | Degs. of Freedom | Mean Square | F Statistics | Approx. Probability |
|---|---|---|---|---|---|
| Between | 5685.58 | 2 | 2842.79 | 4.26 | 0.02 |
| Within | 194660.80 | 292 | 666.65 | | |
| Total | 200346.39 | 294 | | | |

Scheffe's Post Hoc Analysis

| | | | |
|---|---|---|---|
| N | 20 | 102 | 173 |
| Group | Alternate | Withdrawal | Completion |
| Mean* | 131.60 | 123.61 | 116.88 |

*Means with common underlining do not differ signficantly at the .01 probability level. Means not commonly underlined differ significantly at the .01 probability level.

TABLE 5.71. SUMMARY OF INTEREST RELATED SCALE AND ANALYSIS OF VARIANCE FOR TRADE AND INDUSTRY REDEFINED FACTOR VII - OCCUPATIONAL LEVEL

| Factor VII | Factor Loading | Mean |
|---|---|---|
| 1. Occupational Level | .635 | 44.3 |

Analysis of Variance

| Source of Variance | Sum of Squares | Degs. of Freedom | Mean Square | F Statistics | Approx. Probability |
|---|---|---|---|---|---|
| Between | 302.88 | 2 | 151.44 | 4.12 | 0.02 |
| Within | 10733.62 | 292 | 36.76 | | |
| Total | 11036.51 | 294 | | | |

Scheffe's Post Hoc Analysis

| | | | |
|---|---|---|---|
| N | 20 | 173 | 102 |
| Group | Alternate | Completion | Withdrawal |
| Mean* | 47.95 | 44.20 | 43.72 |

*Means with common underlining do not differ significantly at the .01 probability level. Means not commonly underlined differ significantly at the .01 probability level.

The suggestion here is that Trade and Industrial students who change have a higher occupational aspiration level than those who complete or withdraw.

The masculinity-femininity scale redefined as factor VIII and the analysis of variance is shown in Table 5.72.

TABLE 5.72. SUMMARY OF INTEREST RELATED SCALE AND ANALYSIS OF VARIANCE FOR TRADE AND INDUSTRY REDEFINED FACTOR VIII - MASCULINITY-FEMININITY

| Factor VIII | Factor Loading | Mean |
|---|---|---|
| 1. Masculinity-Femininity | .634 | 54.5 |

Analysis of Variance

| Source of Variance | Sum of Squares | Degs. of Freedom | Mean Square | F Statistics | Approx. Probability |
|---|---|---|---|---|---|
| Between | 413.95 | 2 | 206.98 | 4.72 | 0.01 |
| Within | 12812.64 | 292 | 43.88 | | |
| Total | 13226.59 | 294 | | | |

Scheffe's Post Hoc Analysis

| | | | |
|---|---|---|---|
| N | 173 | 102 | 20 |
| Group | Completion | Withdrawal | Alternate |
| Mean* | 55.42 | 53.16 | 52.45 |

*Means with common underlining do not differ significantly at the .01 probability level. Means not commonly underlined differ significantly at the .01 probability level.

The Trade and Industrial student who completed his program scored significantly higher than either those who withdrew or changed to an alternate program. The implication seems to be that the more masculine the interest the more likely that a student would complete a Trade and Industrial program.

Trade and Industrial students who changed to an alternate program had a significantly higher SCAT verbal ability score than those who either completed or withdrew from college. The SCAT V redefined as factor IX and the analysis of variance results is shown in Table 5.73.

TABLE 5.73. SUMMARY OF VERBAL ABILITY SCALE AND ANALYSIS OF VARIANCE FOR TRADE AND INDUSTRY REDEFINED FACTOR IX - VERBAL

| Factor IX | Factor Loading | Mean |
|---|---|---|
| 1. SCAT V | -.441 | 25.4 |

Analysis of Variance

| Source of Variance | Sum of Squares | Degs. of Freedom | Mean Square | F Statistics | Approx. Probability |
|---|---|---|---|---|---|
| Between | 404.01 | 2 | 202.01 | 3.45 | 0.03 |
| Within | 17100.59 | 292 | 58.56 | | |
| Total | 17504.60 | 294 | | | |

Scheffe's Post Hoc Analysis

| | | | |
|---|---|---|---|
| N | 20 | 173 | 102 |
| Group | Alternate | Completion | Withdrawal |
| Mean* | 29.55 | 25.36 | 24.64 |

*Means with common underlining do not differ significantly at the .01 probability level. Means not commonly underlined differ significantly at the .01 probability level.

Students in the Trade and Industrial program generally had a high school grade point average of less than a 2.00. However, the Trade and Industrial students who withdrew had a significantly lower high school grade point average than students who completed the program. While a statistical significance was obtained, such a finding does not have much practical utility because the difference was only .18 of a grade point. In Table 5.74 is presented the high school grade point factor loading and the analysis of variance.

In summary it seems that Trade and Industrial students had similar feelings about social service, physical science, biological science-expressive, business detail, and computational science occupational interest factors. Generally they seemed to score low on the specialization level scale. Trade and Industrial students obtained average SCAT quantitative and SCAT total ability scores.

TABLE 5.74. SUMMARY OF HS GPA AND ANALYSIS OF VARIANCE FOR TRADE AND INDUSTRY REDEFINED FACTOR XII - HS GPA

| Factor XII | Factor Loading | Mean |
|---|---|---|
| 1. HS GPA | -.228 | 1.85 |

Analysis of Variance

| Source of Variance | Sum of Squares | Degs. of Freedom | Mean Squares | F Statistics | Approx. Probability |
|---|---|---|---|---|---|
| Between | 2.20 | 2 | 1.10 | 3.15 | 0.04 |
| Within | 102.11 | 292 | 0.35 | | |
| Total | 104.31 | 294 | | | |

Scheffe's Post Hoc Analysis

| | | | |
|---|---|---|---|
| N | 173 | 20 | 102 |
| Group | Completion | Alternate | Withdrawal |
| Mean* | 1.83 | 1.83 | 1.65 |

*Means with common underlining do not differ significantly at the .01 probability level. Means not commonly underlined differ significantly at the .01 probability level

Trade and Industrial students who completed their programs had the highest score on the technical and masculinity-femininity factors and the lowest score on the verbal linguistic, business contact, and business management interest factors. Trade and Industrial students who changed to alternate programs had the highest scores on verbal linguistic, business contact and business management interest factors as well as on the occupational level and SCAT verbal ability factors. One comment appears appropriate. Generally Trade and Industrial students who complete their program are more likely to express interest in technical physically active occupations and dislike occupational fields related to verbal interpersonal contact than those who change to an alternate program.

Trade and Industrial students who change to alternate programs are more likely to express an interest in occupational fields requiring verbal interpersonal contact and also seem to exhibit more verbal skill than those who complete a program.

## Summary

This second phase of the study was concerned with comparing and contrasting students who completed, changed to an alternate program or withdrew from college within a specific technical and associate degree program grouping. The first phase of this study found that students entering the five discrepant programs differed significantly on the variables under consideration (interest, ability, and high school honor point average). Therefore, a separate factor analysis was carried out for each curriculum area. Five interpretable factors were identified for the Trade and Industrial and Collegiate Technical groups and four for Terminal Business, General Education Science, and General Education Non-Science. To test the hypotheses relevant to this phase of the study the general interpretable factors were redefined into interest factors, interest related factors, ability factors, and a high school honor point average factor.

Table 5.75 lists the redefined factors for each curriculum group. The factors italicized were statistically significant at the .05 probability level. These factors were able to differentiate between groups which were either completed, changed to an alternate program or withdrew from college.

Examination of Table 5.75 suggests some significant and non-significant factor trend for technical and associate degree students. In all five comparisons the factors labeled social service, science, (either physical and/or biological), business management and business detail and specialization level did not differentiate between students who completed, changed to an alternate program, or withdrew from college.

The factors seemed to be able to differentiate more successfully for some curriculum groups and not as well for others. The Terminal Business (one interest and two ability factors) and Collegiate Technical (one interest and three ability) curriculum had the fewest significant factors. The General Education Science (four interest and four ability factors) the General Education Non-Science (two interest and three interest factors that approached significance, and two ability factors) and Trade and Industrial (six interest and two ability factors) curriculum groups had the largest number of significant factors.

The differences in the relative number of variables that were able to differentiate within the various curriculum groupings is of interest. A possible explanation for this difference is in the degree of internal consistency within each curriculum grouping. Terminal Business curriculum programs offered at Ferris State College range from higher accounting to retail sales. Students in the Collegiate Technical curriculum select programs ranging from commerical art to industrial chemistry. The findings imply that the more diverse the programs offered within a curriculum grouping the less effective were the interest factors in differentiating between students who completed, changed to an alternate program, or withdrew from college. A case in point would be Trade and Industrial analysis of variance results where six interest or interest related factors obtained an F significant at the .05 level of confidence. Trade and Industrial programs were one of the more internally consistent groupings studied, specifically relating to some form of technical mechanical, physically active occupation.

Regardless of these inherent reliability problems, certain factors tended to differentiate more consistently than others between the students who completed, changed to an alternate program, or withdrew from college. Only the SCAT V ability factor obtained an F significant at the .05 probability level in all five comparisons. In four cases the withdrawal groups had the lowest verbal ability score and in the other case (General Education Science) the alternate group had the lowest verbal ability score. For three of the curriculum areas, the completion sample had the highest verbal ability score (Terminal Business, General Education Science, and General Education Non-Science). The alternate sample, along with the completion sample, had the highest verbal ability score in one curriculum area (Collegiate Technical). The students who changed to an alternate program from the Trade and Industrial field had a significantly higher verbal ability score.

The SCAT T ability factor was significant at the .05 level of probability for four of the curriculum areas (all but Trade and Industrial).

Both the alternate and completion groups had a significantly higher total ability score than the withdrawal sample in the Collegiate Technical curriculum. The General Education Science completion group had a significantly higher total ability score than either the withdrawal or alternate groups. The General Education Non-Science and Terminal Business completion groups had a significantly higher total ability score than those students who withdrew.

The high school honor point average was significant at the .05 probability level for all the curriculum areas except Terminal Business. The Trade and Industrial, Collegiate Technical, and General Education Non-Science completion and change to an alternate program samples had a significantly higher high school honor point average than their respective withdrawal groups. For the General Education Science curriculum, the completion group obtained a significantly higher high school honor point average than the change to an alternate program group.

The masculinity-femininity factor was significant at the .05 probability level for four curriculum areas. This factor was not significant for Collegiate Technical curriculum. As mentioned previously, this appears related to the divergence of the programs within this curriculum group. For the three curriculum groups in which the

TABLE 5.75. SUMMARY OF REDEFINED FACTORS FOR FIVE CURRICULUM GROUPS

| Factors | Terminal Business | Gen. Ed. Sci. | Gen. Ed. Non-Sci. | Colleg. Tech. | Trade & Indus. |
|---|---|---|---|---|---|
| 1A | Science-Abstract | | | Social Service | Social Service |
| 1B | Social Service | Social Service | Social Service | Phy. Sci.-Abstr. | Phy. Sci.-Bio. Sci. |
| 2A | Verbal Express. | Bio.-Phys. Sci. | Bio. Phy. Sci. | Technical | Verbal Express. |
| 2B | Bus. Detail | Bus. Mgr. | Bus. Mgr.-Contact | Bus. Contact | Bus. Detail |
| 3A | Bus. Contact | Tech. (.06) | Tech. (.07) | Bus. Detail | *TECHNICAL* |
| 3B | *TECHNICAL* | *VERBAL LING.* | Verbal Ling.(.06) | Verbal Express. | *VERBAL LING.* |
| 4A | Bus. Sci.(.07) | Veterinarian | *COMPUTATIONAL* | | *BUS. CONT.* |
| 4B | Computational | *COMPUTATIONAL* | Printer | *COMP. SCI.* | Comp. Sci. |
| 5 | Special. Level | Special. Level | Special. Level(.07) | Bio.-Sci. | *BUS. MGT.* |
| 6 | Occup. Level | *OCCUP. LEVEL* | Occup. Level(.06) | Special. Level | Special. Level |
| 7 | *MASC.-FEM.* | *MASC.-FEM.* | *MASC.-FEM.* | Occup. Level | *OCCUP. LEVEL* |
| 8 | *SCAT V* | *SCAT V* | *SCAT V* | Masc.-Fem. | *MASC.-FEM.* |
| 9 | *SCAT Q* | *SCAT Q* | *SCAT Q* | *SCAT V* | *SCAT V* |
| 10 | *SCAT T* | *SCAT T* | *SCAT T* | SCAT Q | SCAT Q |
| 11 | HS HPA | *HS HPA* | *HS HPA* | *SCAT T* | SCAT T |
| 12 | | | | *HS HPA* | *HS HPA* |

( ) indicates factors which were close to the required .05 probability level. Factors italicized obtained the F required for significance at the .05 probability level or better.

courses carried college credit (Terminal Business, General Education Science and General Education Non-Science) the masculinity-femininity factor differentiated the change to an alternate program group from those who completed and/or withdrew from college. The alternate group had the highest masculinity-femininity score. Psychologically this might be interpreted as implying that students who changed from a collegiate program to an alternate program were more active, restless or impatient than those who stayed or withdrew. The Trade and Industrial completion group had a significantly higher masculinity-femininity than either the alternate or withdrawal groups. This finding appears to be related to the technical-physically active orientation of the programs within the Trade and Industrial curriculum.

The occupational level factor did not significantly differentiate in three of the five comparisons. In the one comparison (General Education Science) the students who completed scored significantly higher than those who withdrew from one of the programs. In another case (General Education Non-Science) the occupational level factor F was significant at the .06 level of probability. On this occupational level factor, the completion group had the highest score and the withdrawal group the lowest. The results suggest that students who are completing programs with a possible four year aspiration score higher than students who withdraw. This did not seem true for terminal or technical certificate programs. For the Trade and Industrial group the students who changed to an alternate program had a significantly higher score on the occupational level than those who withdrew or completed.

The technical factor was significant in two of the curriculum group comparisons, (Terminal Business and Trade and Industrial) and approached significance in two other curriculum group comparisons, (General Education Science and General Education Non-Science). The technical factor was not significant nor did it approach significance for the most heterogeneous curriculum group (Collegiate Technical). Students originally in Terminal Business, General Education Science, or General Education Non-Science who changed to an alternate program scored higher on the technical factor than their completion or withdrawal counterparts. The implication is that the more a student indicates an interest in more work or lab oriented, technical activities as opposed to theoretical, abstract, or "book learning", the more likely he will changed from a college level program to some other program. As one would expect, the students who completed a Trade and Industrial program scored significantly higher on the technical factor than those who changed to an alternate program.

In three cases the computational factor (Collegiate Technical, General Education Science and General Education Non-Science) was significant at the .05 probability level. In all three cases the withdrawal group had a significantly lower computational score than either the completion and/or alternate group. Basically this factor seemed to emphasize a difference between students who are likely to persist in, or withdraw from college.

It seems relevant at this point to examine the significant factors to determine more specifically within each curriculum the differences between students who completed, changed to an alternate program, or withdrew from college.

For the Terminal Business curriculum the significant ability factors, (SCAT V and T) seemed to differentiate those who completed a program (scoring high) from those who did not complete. On the interest factors (technical and masculinity-femininity) the change to an alternate program group scored higher than students who completed or withdrew.

A combination of computational-science interest scales differentiated in Collegiate Technical curriculum with students who completed scoring high on the factor and students who changed programs or discontinued scoring low. On three of the four ability factors (SCAT-Verbal, SCAT-Total, and High School Grades) students who withdrew from Collegiate Technical curriculum scored low. Students who either completed a Collegiate Technical program or changed to an alternate program scored high on these three ability factors.

Trade and Industrial students who completed scored high on a technical factor with withdrawing students scoring at an intermediate level and students changing to an alternate program scoring low. Trade and Industrial students who completed their programs scored lower on the verbal-linguistic factor than students who changed programs or withdrew. The same relationship (completing students scoring low) held on the business contact and business management factors. Students changing from Trade and Industrial to other programs scored high on the occupational level factor. On ability factors, Trade and Industrial students who changed programs scored high on verbal ability. Students who completed or changed program scored high on high school grade point with discontinuing students having a low high school grade point.

## CHAPTER 6

## SUMMARY, CONCLUSION AND IMPLICATIONS

Introductory statement. Describing the technical and associate degree male student is clearly important and necessary, particularly to those high school counselors and college student personnel workers who are dealing with the increasing demand for this type of post high school training and education. This description becomes a more difficult, but important task when one attempts to differentiate the successful from the non-successful technical and associate degree student. Our goal is to: (1) specifically describe students who enter one of several discrepant technical or associate degree programs, and (2) to objectively describe the ways in which successful and non-successful technical and associate degree students differ on interest, ability, and achievement measures.

### Summary

Purpose of the project. The purpose of this project was to comprehensively study the differences and similarities in interest, ability, and previous achievement of male students who entered discrepant technical and associate degree programs. A second purpose was to determine what interest, ability, and/or achievement variables could differentiate between students who completed, withdrew, or changed to an alternate program.

For the purposes of this study, students were considered to have completed the program they initially entered if they completed or continued in this original program at Ferris State College or at another school. Withdrawal was defined as withdrawal from Ferris State College without re-enrollment or transfer to another college.

It was intended that the end product of this research would be: (1) an interest, ability, and achievement description of students who entered one of several technical or associate degree programs, (2) a description of interest, ability, and achievement variables associated with completing, changing, or withdrawing from college.

Hypotheses base. Hypotheses were developed at two levels. At the first level the hypotheses were generated to examine interest, ability, and achievement differences between students entering five discrepant technical and associate degree curriculums. At the second level hypotheses were generated to examine interest, ability, and achievement differences between students who completed, changed, or withdrew from college within each of the five specific technical and associate degree curriculum groupings.

The basic hypotheses were:

1. There will be no differences in measured interest patterns between students entering discrepant associate degree and technical programs.
2. There will be no differences in ability scores between students entering discrepant associate degree and technical programs.
3. There will be no differences in high school grades between students entering discrepant associate degree and technical programs.
4. There will be no differences in ability level between students who successfully complete their original program, those students who make a major change, or students who discontinue.
5. There will be no differences in measured interest patterns between students who successfully complete their original program, those students who make a major change of program, or students who discontinue.
6. There will be no differences in high school grades between those students who successfully complete their original program, those students who make a major change, or students who discontinue.

Design. The above hypotheses were examined within the confines of this study which involved testing each male student previous to his entry into one of the technical or associate degree curriculums. The progress of each student was followed for the length of the program. If a student transferred to another institution, a letter followed by a phone call, if necessary, provided information on whether he should be classified as part of a continuing (completion), change, or withdrawal group.

Sample. The sample used to test the first level hypothesis were all male students entering one of the five technical or associate degree programs in the fall of 1965. Transfer students, females, and students for whom test data was not available were excluded. This resulted in a total sample of 941. At the termination of the study, all students within each curriculum grouping were classified as either having completed, changed to an alternate program, or having withdrawn from college. These outcome groupings were used to test the second level hypotheses.

Instruments. Two standardized instruments, (School and College Ability Test and Strong Vocational Interest Blank-For Men) were administered prior to the actual entrance of the students at Ferris State College. The high school grade point average for each student was calculated on the basis of the last two grades received in academic subjects in four basic areas.

Change of curriculum and withdrawal questionnaires were developed to obtain information on reason for change or withdrawal. This procedure also assisted the authors in following the progress of each individual student.

Analysis. Two statistical procedures, factor analysis and analysis of variance were employed. The factor analysis was selected for two reasons: (1) the SVIB was not developed on a similar population to that used in this study, therefore, it seemed of interest to examine the interrelations of the interest variables (59 scales) in our population, (2) factor analysis is a method of data reduction.

In preparation for the factor analysis an intercorrelation matrix was tabulated for the total group and also for each one of the five curricula groupings. The principal axis solution, which is mathematically precise, was used to obtain factors which satisfied the eigen value criterion for rotation. Rotation was continued until the number of variables loading on a factor was equal to N-1; N being the number of rotations.

The second statistical procedure used was analysis of variance. An analysis of variance comparing each curricula group on each of the fourteen redefined interpretable factors identified for phase one was computed. For those factors which obtain an "F" significnat at the .05 probability level a posteriori test of significance between treatment group means was computed. The analysis of variance was repeated in phase two for each of the 15 redefined factors for the Terminal Business samples, the 12 redefined factors for General Education Science samples, the 14 redefined factors for General Education Non-Science samples, the 15 redefined factors for the Collegiate Technical samples, and the 16 redefined factors for the Trade and Industrial samples.

The posteriori test developed by Duncan was applied to all 14 redefined factors obtained in phase one of the study. Scheffe's method of post hoc analysis was used in phase two because of the unequal n's and small sample sizes in some of the outcome categories. The post hoc analysis was done on 4/15 Terminal Business redefined factors, 8/14 General Education Science redefined factors, 6/14 General Education Non-Science redefined factors, 4/15 Collegiate Technical redefined factors and 8/16 Trade and Industrial redefined factors.

## Phase One Conclusions

**Terminal Business.**

1. Terminal Business students scored lower on the biological-physical science, technical and specialization level interest factors and on the high school achievement factor in comparison to the students in the other four curriculums.

2. Students in Terminal Business obtained the highest score on the business management, computational, and occupational level interest factors.

**General Education Science.**

1. In comparison to the other four curriculum areas the General Education Science student had the lowest score on the business management interest factor.

2. Students in General Education Science programs obtained the highest score on the biological-physical science interest factors and all the ability and achievement factors.

**General Education Non-Science.**

1. General Education Non-Science students obtained lower scores than the other four curriculum groups on the masculinity-femininity interest related factor.

2. The social service, verbal-linguistic, and specialization level interest factor scores were higher for the General Education Non-Science group when compared with the other four curriculums.

**Collegiate Technical.**

1. The most distinctive characterization of the Collegiate Technical students is their lack of either a high or low score in comparison to the other curriculums.

2. The Collegiate Technical students in another way were also similar to Trade and Industrial students with a low score on the social service interest factor.

**Trade and Industrial.**

1. Students in this curricula area had the lowest scores on the social service, verbal linguistic, computational, and occupational level interest factors and on all three ability factors.

2. Trade and Industrial students had the highest scores on the technical and masculinity-femininity interest factors.

General Conclusions for Phase One.

1. All eleven identified redefined factors were able to significantly discriminate between various curricula groups involved in this study.

2. The first five factors ( all the occupational interest factors) seemed to be able to differentiate in a much more practical manner one curricula group from another than the interest related factors. For example on the social service factor the scores ranged from 338 to 420 and on the technical factor the scores ranged from 363 to 483 as opposed to the specialization level factor scores which range from 29.96 to 32.03.

3. The interest related factors (factors V to VII) although they were statistically significant did not seem to be able to practically differentiate students at the technical and associate degree level. When compared with the SVIB men-in-general norm group the students in each of the five curriculums would be seen as scoring lower than the average norm group score on the spcialization level and occupational level scales. This was especially true of the specialization level scale. The masculinity-femininity scale scores ranged around the average norm group score when compared with the SVIB men-in-general norm groups.

4. The ability factors were able to discriminate between various curriculum groups particularly at the extremes.

5. The high school achievement factor while statistically significant did not provide a broad enough range for practical significance.

## Phast Two Conclusions

Terminal Business

1. Only two interest and two ability factors were significant for this curricula area.

2. Students who changed to an alternate program had significantly higher technical and masculine interests than those who completed or withdrew from college.

3. Students who completed a Terminal Business program had higher verbal and total ability scores than those who did not complete a program.

General Education Science.

1. Four interest and all four ability and achievement factors were significant for this curricula.

2. Students who completed a General Education Science program had higher ability and achievement scores than those who were not successful.

3. Students who changed to an alternate program had higher technical (.06 level of probability) computational and masculine interest scores, and lower verbal-linguistic interest scores than either the completion or withdrawal samples.

4. Students who completed a General Education Science program obtained higher occupational level scores than students who withdrew or changed.

General Education Non-Science.

1. Two interest and all the ability and achievement factors obtained significance for this curricula area. Four other interest factors were either at the .06 or .07 level of probability. (These four which approached significance will be discussed here because they tended to fit into the general pattern of completion versus change).

2. Students who withdrew from college obtained lower ability and achievement scores than either/or the completion and change samples.

3. Students who completed a General Education Non-Science program had higher verbal-linguistic (.06 probability level), specialization level (.07 probability level), and occupational level (.06 probability level) interest scores than students who either withdrew or changed programs.

4. Students who changed to an alternate program had higher technical (.07 probability level) and masculine interest scores than those who either completed or withdrew.

5. The students who withdrew from college scored lower on the computational interest factor than either those who completed or changed to an alternate program.

Collegiate Technical.

1. Only one interest and three ability-achievement factors were significant for the Collegiate Technical curricula.

2. Students who withdrew from college within the College Technical Division had less verbal and total ability scores and a poor high school record when compared with the completion or change group.

3. Students who completed a Collegiate Technical program obtained higher scores on the computational science factor than either those who withdrew or changed programs.

Trade and Industrial.

1. Six interest, one ability, and one achievement factor were significant for the Trade and Industrial curricula.

2. Students who changed to alternate programs obtained higher verbal-linguistic, business contact, business management, and occupational level interest factor scores and higher verbal ability scores when compared with students who completed a Trade and Industrial program or withdrew from college.

3. Students who completed a Trade and Industrial program obtained higher technical and masculine interest factor scores than those who changed or withdrew.

Phase Two General Conclusions.

1. Ability and high school achievement scores seem more able than interest or interest related variables to differentiate between students at the associate degree level who either complete a program, change to an alternate program, or withdraw from college. This was particularly true when students who completed were compared with students who withdrew from college. The completing students consistently received higher ability and high school achievement scores than did the students who withdrew from college. The students who changed to an alternate program in some cases were similar to the completion group and in other cases similar to the withdrawal group.

2. The signficant interest or interest related factors in most cases differentiated the change to an alternate program, students from either or both the completion or withdrawal groups. For example, the alternate group had a significantly higher masculinity-femininity score in three our of the four cases in which this factor differentiated alternate students from the completion or withdrawal students. In the other case, Trade and Industrial students who completed a program had a significantly higher masculinity-femininity score than either alternate or withdrawal students.

3. It appears reasonable to conclude that ability and achievement factors, rather than interest or interest related factors, are more able to differentiate between students who will be academically successful and those who will be unsuccessful. It also seems reasonable to conclude that some interest or interest related factors are able to differentiate between students who tend to change into an alternate program rather than complete or continue in their original program. Restated, it can be said that ability and achievement factors indicate the level of program one can succeed in. Interest and interest related factors suggest the direction within that level that a student may take.

4. The results of this phase of the study suggests a relationship between diversity of program content within one curricula area and the capability of interest, ability and achievement measures to separate students who complete, change and/or withdraw from college. Terminal Business and Collegiate Technical curriculums had the most heterogeneous program groupings and the fewest significant factors. General Education Science, General Education Non-Science and Trade and Industrial curriculums were the most homogeneous and had the highest number of significant factors.

5. Another interesting relationship between significant factors and type of curriculum seems worth mentioning. Rating the curriculum involved in this study from the most collegiate and non-collegiate it can be observed that Trade and Industrial programs are non-college credit and that at the other end of the pole all the programs in General Education carry college credit. Ability and achievement factors were significant in only two out of the four Trade and Industrial comparisons. It is possible that the more collegiate the programs the more relevant are ability and achievement measures in comparing successful and non-successful students.

## Research Implications

1. In general, the findings of this study show that ability factors could predict success in the type of college programs studied. Interest factors predicted at a more modest level and tended to relate to direction of movement in educational-vocational choice rather than to success over the short duration in one college program. As vocational development is a life long and fluid process, it seems quite apparent to the authors that the use of interest instruments for predictive purpose must be based upon a longitudinal study of individuals.

2. One of the more interesting groups of students involved in this study were those students who changed to alternate programs.

Unfortunately, it was beyond our scope to specifically study these students in any great detail. Our impressions were that individual analyses of the SVIB profiles of these students in relation to their direction of vocational movement would produce very interesting results. These results could very well be along the lines of demonstrating the effectiveness of the SVIB in predicting direction of change as compared to its limited effectiveness in short term prediction or success in a specific program.

3. A contrast was found in the ability of interest variabilities in discriminating between students who were successful and not successful in various types of technical programs. Interest variables were able to discriminate between outcome in the non-collegiate Trade and Industrial programs, but were relatively ineffective in discriminating in the Collegiate Technical programs. This finding has been confirmed in other studies at Ferris State College and seems related to the combining of Collegiate and Terminal Business level related education and technical subjects in Collegiate Technical vs a relatively "pure" technical offering in Trades and Industrial. The implication for future research is at the junior college level and is that prediction of success vs failure may be more difficult as technical programs are upgraded to transferable college credit status.

4. This study finds that students who are not successful in the program they select upon initial enrollment in college tend to withdraw from college rather than change to an alternate program. This withdrawal was initiated despite the extensive range of alternate programs and counseling facilities that were available to students in the situation studied. It is the impression of the authors that is was almost a necessity for unsuccessful students to have a recovery time follow their initial abortive college attempt. A broad area of research seems implied by this observation. First, is it actually necessary that a period of non-attendance must follow an unsuccessful college experience? Secondly, if such a recovery period is a necessity, what psychological factors are involved?

5. The masculinity-femininity interest related scale of the SVIB fairly consistently proved to be one variable that different between the various outcome groups studied. This finding was especially apparent in the case of skilled-trade oriented technical programs. In view of the limited knowledge we have of non-interest factors associated with vocational and educational success, this finding has very apparent research implications.

6. Of the ability related factors studied, the SCAT verbal scale most consistently predicted success in the various programs

studied. This is in line with previous knowledge in the area of prediction of academic success at the baccalaureate and higher levels of college education. This study implies that future researchers can use vocabulary or verbal ability as a best single predictor of success at the technical as well as at the bachelor educational level.

7. In all instances in this study, the factor analysis of interest variables resulted in four and five factors accounting for the majority of the variance contained in these variables. This finding seems to imply to future research that actual ability of available interest instruments is limited to fewer occupational families than these instruments usually encompass.

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# APPENDIX

# APPENDIX A: QUESTIONNAIRE SENT TO STUDENTS

## WITHDRAWAL FORM

Name______________________________ Student Number______________

Division__________________________ Date ____________________

QUARTER AND YEAR OF WITHDRAWAL:

FALL________ WINTER________ SPRING________ SUMMER________

WITHDREW: During Quarter:__________ End of Quarter:__________

HPA: Cumulative:____________ Last Quarter:____________

REASON FOR LEAVING FERRIS STATE COLLEGE:

____________ Health

____________ Financial Difficulty

____________ Low Grades

____________ Lack of Interest

____________ Change of Interest

____________ Transfer to Another School

____________ Family Difficulty

____________ Enter Service

____________ College Adjustment Problems

____________ Marriage

____________ Other (Please Explain)

THIS WILL BE:

____________ Permanent

____________ Temporary

# APPENDIX A: QUESTIONNAIRE SENT TO STUDENTS

## REQUEST FOR CHANGE OF CURRICULUM

Date:......................

1. I hereby request permission to change from........................
Present Curriculum

to....................................for one or more of the
New Curriculum

following reasons:

1. .......Change of interest in program.
2. .......Low grades in present program.
3. .......Change suggested by someone Who.......
....................
4. .......Change always anticipated.
5. .......Job opportunities more promising in new program.
6. .......Initial program selected because of high school grades.
7. .......Completed original program.
8. .......Other(please explain)
.....................

...................................
Date change is to be effective

.................................
Signature of Student

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DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
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ABSTRACT

Nine hundred and forty-one men students enrolling in five associate degree and technical certificate programs were studied over a two year period. Differences were determined on interest, interest related, and ability-achievement factors as related to choice of program, success and continuance in program and continuance in college.

Specific instruments employed were the Strong Vocational Interest Blank, the School and College Ability Test and an index of high school achievement.

Factor analysis was employed to derive comprehensive variables from the specific instruments employed. Analysis of variance with posteriori tests were utilized to determine statistical significance of difference between various program selection and outcome groupings.

All variables studied differentiated at a high level between students selecting the various types of programs studied. Differences between students completing programs, changing to an alternate program or withdrawing from college were at a more modest level. Interest and interest related factors tended to best predict which students would complete a program as opposed to best predict which students would complete a program as opposed to withdrawal from college.

Sixty-four percent of the students studied experienced academic success while in college.

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